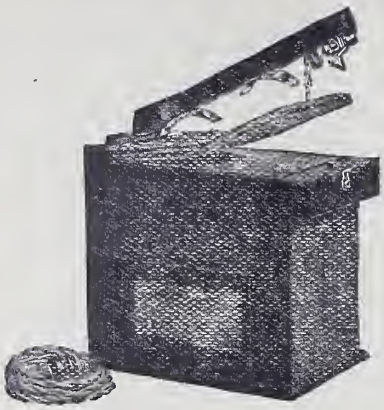
Vol. 57. No. 10 October 1920 20 Cents

The Photographic Journal

of America

Published Monthly
With Illustrations



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AN ILLUSTRATED MONTHLY DEVOTED TO THE SCIENCE AND ART OF PHOTOGRAPHY

THE OLDEST PHOTOGRAPHIC MAGAZINE IN AMERICA

Founded 1864

Incorporating:

The Philadelphia Photographer The Photographic World

THOMAS COKE WATKINS, Editor

CONTENTS FOR OCTOBER, 1920

YEARLY SUBSCRIPTION, in advance, postage paid, United States, Mexico, Cuba, Philippines and Porto Rico, $2.00; Canada, $2.35. Countries in the Postal Union, $2.75. Single copies, 20 cents.

REMITTANCES may be made at our risk by money order, check, draft, or registered letter.

SUBSCRIPTIONS begin with current issue.

Published by EDWARD L. WILSON COMPANY, INC.,

THOS. C. WATKINS, President. 701 Arch Street, Philadelphia, Pa.

EXECUTIVE and EDITORIAL OFFICES, CAMERA BUILDING, 122 EAST 25th ST., NEW YORK CITY

HOUGHTON'S, Ltd., London, Eng., Agents for Great Britain

American News Co., Distributors for U. S. Kodak Australasia Ltd., Sydney, Agents for Australia

RICHARD HILL, Devonport, Auckland, Agent for New Zealand

Entered at Philadelphia Post-office as Second-class Matter

ELIAS GOLDENSKY
PHILADELPHIA, PA.

The
PHOTOGRAPHIC
· JOURNAL ·
· of AMERICA ·

VOLUME LVII OCTOBER, 1920 NUMBER 10

COMPARISONS IN PORTRAITURE

By A. W. B.

THE ordinary method of the present-day professional seems to consist of a complete suppression of non-essentials. He uses a background so delicately tinted that it cannot possibly suggest clouds, and takes the head and shoulders only. Generally, he makes a vignetted picture; but even if he does not, all he has in his portrait of a man besides the face is the collar, necktie, and a few square inches of coat. With women, many photographers get rid of still more of the non-essential. By taking a lady in a low-necked dress and hiding the bodice with an abundance of chiffon, the shoulders appear to rise out of a mass of airy material which is even less likely to obtrude than the simplest of dresses.

As a portrait, a picture in which it is recognized that the face is the thing and nothing is allowed even the remotest chance of taking the attention from it, the modern vignette is perfect, and yet—Let us look at the old-fashioned portrait again for a few minutes, forgetting its many faults. This may be said for it: It conveys the sitter as he was, or as he wished to appear. There is something of his character in the punctilious neatness of his attire, and his curious, upright attitude—although the latter is partly due, doubtless, to an uncomfortable head rest. And, again, if we could persuade ourselves that the portrait was taken in his own home, we might take it as giving some inkling of the style in which he lived. This much may be said for the early photograph: It conveys more to us than the vignettes of today will to those who look at them forty years hence. The older picture has atmosphere (in the artistic, not the scientific sense); but unfortunately it is porduced by false and elaborate arrangements of the photographer, instead of being the natural surroundings of the sitter.

This comparison brings us to what I choose to call the newest school of portrait photographers—those who attempt to convey more of their sitters than

mere outer lineaments, or to add some charm to their pictures beyond that of straightforward portraits.

There are photographers, women, many of them, who have made successes for themselves by catching child subjects in their brightest moments, by adding the charm of innocence and happiness to little faces that the ordinary worker would portray looking serious and perhaps even frightened. And with women, too, the new photographer contrives, partly by carefully chosen methods of lighting, partly by some magnetic gift in managing the sitter, to produce a portrait with all the charms of the original, and perhaps a little more.

But it is with men that the new photographer finds the greatest scope, posing, lighting and managing them to get, not the usual faint, meaningless smile, but an expression which conveys something of the sitter's character. It may be said at once that the photographer who can do these things is born, not made. His work is not to be seen in abundance in the windows of even the best professional photographers, though here and there one sees a portrait that appears to have been taken in the best possible way.

The best portraits to be seen are often those of actors, possibly because these sitters are masters of pose and expression. Let me quote one or two examples which are to be seen everywhere on picture postcards. There is a portrait of the bright mercurial comedian who skips about the stage like a schoolboy. This photograph is a full-face, in perfect focus; the face appears to be thrust forward a little, the eyes are wide open and staring straight out of the picture, while the lips are slightly parted, as though the sitter were about to speak. Another example is of a famous tragedian, whose forte appears to lie in the direction of sorrow and self-renunciation. In this case the profile has been taken with the head thrown back a little; the face is slightly out of focus; the background very dark: all which help the expression of dreamy sadness which the actor has assumed.

In portraying women and children, then, the aim should be to get into the picture the charm which is natural to the sex or age of the sitter, and which, incidentally, may be wanting or not in evidence in the particular subject with which one has to deal. With men sitters the object is slightly different—one wants character, not charm. It has been said of Shakespeare that he has no heroes, only heroines; it would perhaps be more correct to say that, with one or two exceptions, his women are charming pictures, but his men are exquisitely accurate portraits. To return to photography, it may be said that an ideal portrait of a man may or may not be in very sharp focus, according to the subject, but the ideal portrait of a woman is never really sharp.

Take a keen business man in sharp focus, thus giving his face an appearance of alertness; but if you have to deal with the reflective face of a student, it would probably be better slightly out of focus. Take an old man with all his wrinkles, and a young woman with none of hers. Avoid accessories that convey a wrong impression.

Often the subject is against the would-be truthful and artistic photographer in his desire to produce the right thing. You find a gardener or a ploughman at his work, and he is so typical and picturesque that you suggest photographing him, whereupon he immediately regrets that he is not wearing his Sunday clothes. In them he believes he looks something like a gentleman, and he would rather appear as a counterfeit gentleman than as a genuine gardener or ploughman. So with children. You meet a little girl with tousled hair and disordered pinafore, a charming picture of happy romping, child-like carelessness, and, as she is, a delightful subject. But you will get no picture worth having if the mother is anywhere near. She will insist on combing the dishevelled hair and straightening the pinafore, or perhaps, worse still, replacing it with a clean one. She cares nothing for the natural state of things; her ideal (for show purposes, at any rate) is an unnaturally clean and uncomfortably tidy child.

CARBON PRINTING FOR PROFESSIONALS

By A PRACTICAL PRINTER

Enlargements

THERE is nothing to compare with a carbon enlargement, and owing to their wondrous beauty they appeal to the customer at the first glance. I believe it is well to have a number of them, suitably framed, in the place of honor in every studio where carbon work is practiced. As carbon is not sensitive enough to enlarge directly upon, we first make a carbon transparency from a well-finished negative and from this make an enlargement in the camera. For wealth of detail and perfect gradations in tones there can be none too much praise given the carbon transparency, hence it is fit and proper to make the positive to enlarge from in carbon. All who make enlarged negatives even for other than carbon work would do well to make the positive in carbon. For this purpose a special tissue, transparency black, is used. It differs from the ordinary tissue only in being made of a very much more finely ground pigment and costs a trifle more.

The print is made as for single transfer, is squeegeed on a plain glass coated with the waxing solution, or albumen, and save that it is printed considerably deeper than it would be for a print, differs in no way from the ordinary work. When dry it may be varnished, and after the enlarged negative has been made from it, it may be used as a window transparency.

With the special transparency black, lantern slides of the choicest quality are readily made, and providing the negatives are small enough to admit of contact printing, the process is as cheap and easy as any other. I usually coat the glasses with albumen solution, dipping them wholly in and racking to dry, as it is difficult to tell which side is albumenized, and dipping is quite handy. A solution of the white of one egg, well shaken, in eight ounces of water, with a drop of strong ammonia added, answers profitably. By adding a little formalin the albumen solution might be made to keep, but it is probably better to make it fresh twice a week. The glasses being dry, the prints all made, I wet the latter and squeegee or roll them on to glasses, laying all in a pile and placing a blotter of the right size between each slide. On each pile of twenty-five a weight should be placed, and if one is doing a hundred or so, by the time the last pile is made the first lot is ready to develop. If one has a washing tank of sufficient capacity it will do nicely for developing. If not, a wire cage can be made which will hold the requisite number. About four with a capacity of twenty-five each will be convenient for the average worker. Whatever form is used, it had best be something that will hold the slides vertically. Fill the tank or cage with slides, immerse it in water at about 100° F. and leave the slides there until the backing shows signs of being ready to drop away. Then by gently raising and lowering the cage the paper slips off and the pigment begins to rapidly leave the plate where it is soluble. Changing the water a number of times and raising and lowering the cages, we soon have as fine a lot of slides as ever were made. After the soluble pigment is all washed away, a few minutes' immersion in alum water and a final rinsing complete the work. The fact that the slides are reversed makes no difference, as it is only a matter of placing the thumb mark accordingly on the finished slide. I do not varnish the slides at all, simply matting and binding a cover closely down on each slide. Slides made from transparency black will stand oxyhydrogen or electric light, but the colors of the ordinary tissue are not ground sufficiently fine. They are all that could be desired for oil lanterns and form a most agreeable change from black and white, but, as stated, they will not be satisfactory with a light stronger than oil.

Making

While such excellent papers are to be had at reasonable price from the stock house, I do not suppose any would care

to make their own unless it might be the single and double transfer paper. However, for the benefit of those who would like to experiment, I append a formula for making tissue as well as those for single and double transfer paper, etc.:

CARBON TISSUE

Coignet's gold label gelatin	2 ounces
White loaf sugar	3 ounces
Water, hot	40 ounces
Coloring matter	to suit

Grind up the color with a little of the warm jelly and add to the bulk, which may be kept liquid in a water-bath. Test from time to time by floating a strip of white paper on it and look through it at the gas jet. If the flame can be seen, add more and more color until it cannot. To coat the paper, moisten it slightly and lay it on a sheet of glass, then pour on sufficient of the jelly to coat it amply and level it while setting, after which it may be hung up to dry. Windsor and Newton's moist water colors are almost all suitable for this work; sepia, Indian red, black, and some of the browns being excellent.

SINGLE TRANSFER

A

Nelson's No. 1 gelatin	1 ounce
Water	20 ounces

Dissolve in water bath.

B

Chrome alum	20 grains
Water	2 ounces

When A and B are thoroughly dissolved, add B to A in very small quantities at a time, stirring vigorously during the whole mixing. Apply to any paper desired, or to metal, canvas or wood.

DOUBLE TRANSFER

A

Nelson's hard gleatin	1 ounce
Water	8 ounces

Dissolve in water-bath.

B

Chrome alum	30 grains
Water	1 ounce

Add 3 drams of B solution in 2 ounces of water to the entire quantity of A, stirring as it is added little by little. Then float the paper selected on this solution.

WAXING SOLUTION

Yellow beeswax	2 drams
Benzole	1 ounce

When dissolved add

Ether	1 ounce
Alcohol	1 ounce

ANOTHER

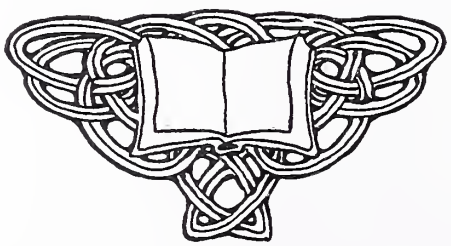
1

Benzole	1 ounce
Beeswax	3 grains

2

Turpentine	1 ounce
Resin	12 grains

Dissolve separately and mix the two. Pour a little on a flannel rag and rub the surface to be waxed, well polishing with a dry flannel rag.



NOTES ON CHILD PORTRAITURE

By JOHN A. TENNANT

IN the treatment of a single childish figure we have an infinite variety of effects from which to choose. Simplicity will most often be the keynote to success, whether we photograph the child alone or with an accessory of some sort. Among a number of prints received from Japan were several studies of a child arranging flowers and sprays of budding plants in vases. The combination impressed me as a peculiarly happy one, and its mention suggests a line of work wherein many novel and interesting effects may be obtained. The draperies need careful attention in pictures of this sort. Our endeavor should be to avoid stiffness in arrangement, and to reproduce something of texture and detail, instead of the harsh and confused mass of clothing often observed in children's pictures. This, of course, is largely a matter of illumination, exposure, and development.

The difficulty of shyness or reserve is more often encountered with single children than in photographing groups. This we can generally overcome by taking the child into our confidence, and explaining the camera as we get it ready, avoiding absolutely any remarks calculated to alarm the little one. I have had the best results when I had the camera set up and focussed on a particular spot, asking the child, perhaps, to show me its eyes wide open for a moment while I secured the proper sharpness, and then allowing it to wander away at will. By noting the surroundings properly, the operator may avoid the necessity for any further use of the ground-glass, putting in his plate, setting the shutter, and, with bulb in hand, awaiting the happy moment of the child's return. A chain, a railing, a curtain, the open window, a door ajar, the end of the piano, a rug on the floor—all these may serve as locating points for the little boy or girl to be pictured and helped us to get them on the plate.

Generally, the chief annoyance the ambitious worker will have results from the well-intended efforts of the friends and relatives of the child to help. A charming disorder of apparel is seen; but the child is promptly taken off and hastily attired in its best bib and tucker, meanwhile being often pulled into stiffness and ill-humor. Then, when shining with the face-rubbing, stiff in its unaccustomed finery, the little one comes to the camera, the friends come, too, and it is "Now, Edith, look pleasant; *do* hold your head up!"—"*Don't* stick your fingers in your mouth," and so on, *ad nauseam*, until the poor child is utterly impossible. Under such conditions I have found a little guile very useful: Let the well-meaning relatives or friends stiffen up the subject to the last notch of woodenness, and then go through the motions of an exposure, all but exposing the plate. Then, explaining that you merely want to try an experiment, drive out the friends, get the child soothed into naturalness, wait until all memory of the ordeal has passed, and take your own chance with the plate! As to clothing, there can be no question that the best is that in which the child will be most comfortable. The simpler it is, the better; it is the child you are picturing not the dress.

It is always better, provided the worker is properly acquainted with the child, to have not more than one other person about. Nothing so detracts from naturalness, or so tends toward the usual studioishness of the gallery portrait, as a number of assistants. Get rid of them, all but one sympathetic helper who can be depended upon to do only what you say, and your chances of success are far better. A child is easily confused, and does not yield so well to the camera's needs when several people claim attention.

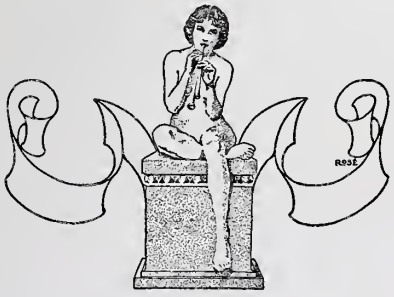
Very young babies are hard to manage, unless in the mother's arms. The spectacle of a plump child piled into a chair in which it is unable to sit alone may be pleasing to the parents, but there is no picture coming. The very little one is often most charming as the mother holds it, and with proper care results that are pleasing may be had. Unconventional

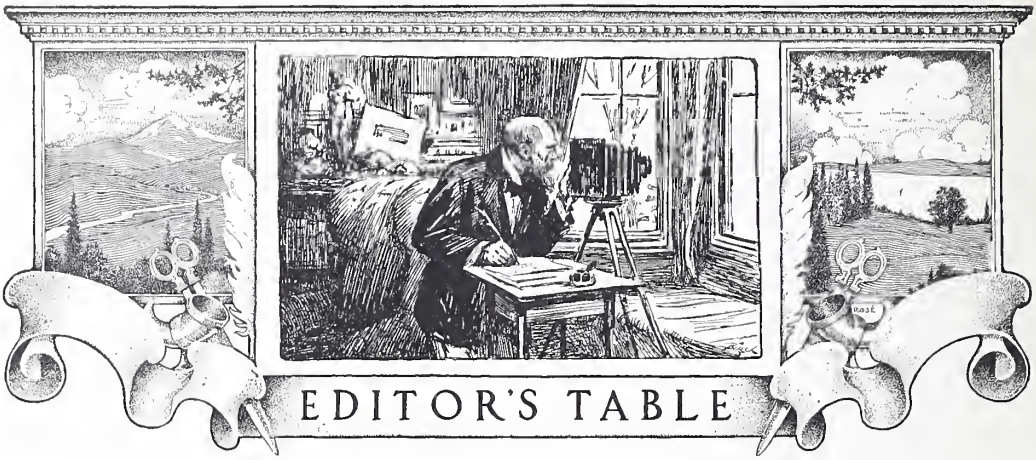
By E. B. CORE, NEW YORK

pictures may be made by preparing for the work in a very bright light, the camera resting on a stool or large book, focused on a selected spot, wherein the child is induced to creep. Many dwelling-houses have large windows, so that when the curtains are fully put aside the light is strong enough to permit of exposures of one-half to one second; and while some plates will be wasted, some priceless negatives may be obtained. When the child is able to stand up to a chair the sympathetic and well-prepared worker has some fine chances, and pictures which show the bare feet of the little child are often most charming. The baby may be induced to play on a dark rug, placed in the proper light, and then it is a matter of patience and good judgment.

In photographing children with their toys two or three little points need close attention. It is better, for instance, to wait until the little ones are really interested and busied with their toys than to get them merely holding a toy and looking at the camera.

Sometimes a toy in the hands of a very young child is an obstacle to success, because the baby will put things to his mouth. Here, of course, the toy should be retained by the photographer or kept out of sight altogether. When and where and how to use toys in handling children are, in fact, questions which can only be carefully answered with a knowledge of the children and the circumstances. Occupation of some interesting sort, or a picture-book, may often be substituted for the toy with positive advantage. Perhaps the most charming of all the children's pictures I have seen is a group of children "playing school," made by Mr. Core (see illustration). The group comprises five or six children of one family, and takes the form of a lateral triangle running lengthwise across a 5 x 7 plate. Four of the children, arranged in the order of their ages, are grouped closely together to form an oblique, irregular line, dividing the picture space from upper left- to lower right-hand corner. The way in which they nestle together to see a folio held in the hands of an elder child is very delightful. At the left hand the dark figure of an elder brother, busied with a design upon the miniature blackboard or wall-slate, adds force to the motif, and at the lower apex of the triangle sits the baby of the family, slightly separated from his fellows, independently occupied with a picture-book in proud imitation of his companions. Pictorially the little figure binds the composition together, and the arrangement of lines and tones gives one a continual feast of pleasure and interest. Numberless compositions along similar lines will suggest themselves, in which the small furniture so commonly used by children nowadays may be made to help in the picture-making.





EDITOR'S TABLE

ON ADVERTISING

WE will take it for granted that advertising, in one form or another, is a necessity in the building up of photographic business.

It simply becomes a question of how to advertise; what to say and what not to say. So much depends on the impression you create in the minds of the people who see your advertisement.

You had better say too little than too much. What is left unsaid cannot come back at you.

If you write your own advertisements be careful not to make statements that you cannot back up, or if you employ someone else to do your advertising, see that they do not commit you to more than you can perform.

Beware of the "literary" advertisement—a beautiful string of adjectives is less convincing than a plain statement.

In your newspaper advertising a few simple statements set in good plain type will, in the long run, carry much more weight than extravagant claims set in fancy type with frills.

Let your circular matter be the best you can get. Good paper, good type, and careful composition. As an artist you appeal to the artistic side of your clients. Carry it out in your advertising as well as your picture-making.

Do not advertise "how cheap," but "how good." The demand for good portraiture can be increased a hundred-fold just as soon as you can make portraits that are portraits.

DARK BACKGROUNDS AND SIMPLICITY

THE dark background has done yeoman service for American photography: it taught the value of simplicity. If we change to light backgrounds we shall find ourselves in a more difficult position. For though success with a dark background is only moderately easy, success with a light one is still less easy. There is little doubt, however, that with light backgrounds the *best* men will achieve greater triumphs than they have with the dark ground, and these triumphs will be most complete in the portrayal of the more delicate gradations of spirituelle feminine beauty. Look through the last volume of the JOURNAL. Half the frontispieces have light backgrounds, and only two or three have absolutely dark ones. The management of a light ground, to score a complete success, is difficult. How harsh and prominent the hair is apt to show against a light background, and how dark flesh so often looks against anything very light. But in capable hands a more subtle and delicate modelling can be obtained against a white ground than against a dark one.

The question hinges on relative tone and on tone value. Tone is not color or even tint. It is the amount of light received by any part of an object and is judged in its relation to the light received by other parts of the same object. A picture may be flooded with light from behind the camera, all visible parts being equally illuminated, and if so all the

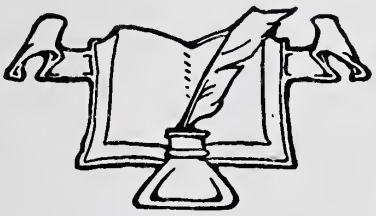
picture will be in one tone. There may be white lace against dark velvet, and one photographs light and the other dark, giving, it may be, a very beautiful and altogether pleasing picture. But that is due to differences of color, not of tone. With dark backgrounds we do not get better relative tones than we do with light; but it is easier to get acceptable results.

We often hear the question asked, "What is there in it?" when a photograph is shown and eulogized. But the answer is, "What is there left out?" The beauty of a picture often consists in the absence of the disturbing objects. Introducing what should be pleasant and attractive ones is dangerous. The art of omitting is everything.

With the dark background we have developed this art; and the omission has gone further than accessory. A brilliantly lighted figure against black stands out boldly, and at first may please; but soon the effect is tiring. We have, therefore, striven to keep our figures somewhat subdued, and have tried for success in the delicate harmonizing of flesh and dress and background.

There may be times when even a checker pattern may pass as a background—but only in genuine at-home portraiture. If a man is photographed in his study or a lady in her boudoir the real wall paper and everyday objects may improve the photograph for all those who know the sitter amid such surroundings; but to place the sitter with some pronounced studio surrounding which has no connection with his everyday life is invariably a mistake.

It is a mistaken notion that the customer demands some special thing. It is the photographer who takes up glossy or matt or some other style and says it is the latest novelty—and forces it on the customer. People will take good work as quickly as that of indifferent quality. If it is not easy to see a valid reason for using an accessory, let the accessory be omitted. It may be that there is one way of introducing it to advantage; there will be several ways of introducing it to disadvantage; and therefore safety lies in omission. The fashion of dark backgrounds has tended to teach us breadth, and therefore it is a good fashion; it has, too, helped toward simplicity, and therein it has steered us clear of many dangers. If we return to light backgrounds and accessories let us feel our way gently, knowing why we make any move before we do make it, and remembering that we are returning into a more difficult field, where a complete triumph may perhaps be a great triumph, but where the dangers are rendered more dangerous and infinitely more numerous.



PRACTICAL PAPERS ON STUDIO WORK AND METHODS

The Focusing Screen

A KNOWLEDGE of facial anatomy would prevent a retoucher from treating the nose as if its bone ran from base to tip. It would teach him that the lower part of the nose has no bone in it at all, and that the line of light on the upper part should not be carried in an unvarying run right to the high-light on the tip. It would teach him also that a sitter's forehead should not be smoothed out until it looks like the outside of a pudding. Phrenologists say that the part of the brain which controls the perceptive faculties is situated in the front of the head, but the "bumps" would be difficult to locate on a badly retouched photograph.

One does not hear so often nowadays the old photographic slogan, "Expose for the shadows and let the high-lights take care of themselves." The best portrait workers today do not admit the soundness of the old saying. They say that the correct way to expose is not to consider the shadows only, but the general effect. They maintain that it is much more important to expose for the halftones than to aim at getting every speck of detail into the shadows.

In representing a natural object by monochrome, a compromise must be made with Nature's scale to secure proper graduation of light and shade. The highest light in a photograph can be no lighter than white paper, and the deepest shadow can be no darker than the deepest tint of the chemical deposit; and the range of gradation between the two is very small compared with the infinite gradations of Nature. Absolute truth, therefore, cannot be secured; something has to be omitted—and it is just here where art steps in to help the photographer.

Many successful studio operators fail conspicuously when they turn their hands to home portraiture. This is due to the fact that they treat home portraiture as something entirely different from portraiture in an ordinary studio, and do not make an intelligent use of the experience in lighting which they possess. The studio operator controls his lighting almost entirely by adjusting his blinds and head-screens, and not by moving the sitter in relation to a fixed light. When he finds himself in a position, therefore, where he cannot use blinds, and where there is no room to use a head-screen, he is at a loss, and his portraits frequently are no better than those obtained by comparatively inexperienced workers.

Photographic nomenclature must sometimes strike outsiders as being rather queer and not conveying a true idea of the functions of the various individuals engaged in the making and selling of portraits. Why we should call a man who aspires to be, and often is, an artist, an "operator," as if he worked a linotype machine or a telegraph instrument, is a little obscure, but not more so than to call a lady, whose main object in life is to obtain orders, a "receptionist." It is a term that might more properly be applied to a floorwalker. If we use the word receptionist we must never forget that it means saleswoman, and that good manners and a neat appearance are not the only necessary qualifications for the job. Given a good saleswoman, she should be allowed to devote herself to her proper work and not be required to do retouching or similar work. Salesmanship is necessary in photography, and we believe that finding new business in one way or another is the logical work of the "receptionist."—*Photo Digest.*

The Dark Dark-Room

As many photographers of experience know, the objections to working in absolute darkness in the dark-room are more imaginary than real. For the benefit of the uninitiated, who thereby are deterred from taking full advantage of the properties of panchromatic plates, it may be worth while to give one or two hints on manipulation when working without a safe-light. In loading dark-slides, let these be placed open, one above the other, to the left of the working bench, while on the right are placed the plates, removed from the boxes, but still in their wrappings. Knowing the system on which the manu-

facturer packs his plates, it is an easy matter to take them in pairs from the wrappings entirely by touch of the glass sides only. A loose, instead of an attached, separator certainly is more convenient when working in the dark; the cards should be kept in a little pile, also on the right, and one taken and slipped between each pair of plates, when the triple unit can be quickly placed in the dark-slide. When it comes to development it is a good plan in our experience to remove all the plates from the slides, stacking them in pairs, film to film, inside a clean box with an open front placed so that the plates themselves will be protected from chance splashes of developing solution while waiting their turn. If this plan is followed it is a simple matter to load plates into a tank with as great a degree of precision as though the film surface could be seen. Where considerable numbers of plates are being developed it is a great advantage to have a light-tight box for the reception of the waiting plates, as one can then use a fair quantity of red light after having covered the developing tank or dish. Developing by time is thus facilitated, but if it is inconvenient to have no light whatever in the dark-room good use can be made of a luminous wristlet watch for timing, or of one of the pocket electric torches, which can be used to render visible the face of a small clock ensconced in an open-fronted box fitted directly under the developing bench.—*B. J.*

Some Remarks on the Choice of a Lens

THE selection of a lens should depend mainly on the particular work it is required for. An instrument designed for process work is not the most suitable for busts, nor a lens of the Petzval type the best for outdoor groups.

These considerations, however, are not always paramount when a lens is being bought, insignificant factors often being given first importance, with subsequent loss to the buyer. The indirect loss, in quality of work, brought about by the use of an unsuitable lens may be much greater than the user might think, and quite out of all proportion to the cost of a lens.

I knew one camera user who never bought any but second-hand instruments. These he would always consider, whether they were suitable to his work or not, and he was not a dealer in lenses. There was another who would never look at a cheap lens, and a third who judged all lenses by their place of origin; opining that if a lens came from Germany it must of necessity be right; if it did not, then it wasn't much good for any purpose. Some judge a lens by testing, the said testing being limited to the taking of a couple of negatives. Others are content with the image as shown on the ground glass. The price of a lens is considered as a criterion of its properties, as is also the name on the mount. I have known a good (but cheap) portrait lens lie within reach and idle while an expensive anastigmat of short focus and needle-point definition was used for single-figure portraits. And in another case where a studio was offered a most useful universal lens at a fraction of its value, and although the work was suffering for the want of a respectable lens, it was rejected because no one there recognized the maker's name.

Now the majority of us have no inclination to go delving into optical science; but good lenses for individual or general purposes can be found without this, and very often without paying big prices or looking for makers' names, particularly German names. At the same time it must not be forgotten that a little technical consideration is necessary if we would get the lens that will do the particular job or jobs with the best result.

Take the simple case of a photographer who makes busts exclusively and does not enlarge. What kind of lens or lenses will he require? He does not need more than one, and provided it possesses suitable focal length and quality of definition, the make and price are relatively unimportant. If we wish to pay a big price for such a lens it is quite easy to do so. If we want one at a low figure it can generally be found. Suitable types are the soft-focus anastigmat, the Petzval and the R. R. A single component of a good R. R. or of a convertible anastigmat makes an excellent portrait lens. It is of longer focus than the complete lens, but has not the same rapidity at the same actual aperture. Whatever lens is chosen for bust work, a focal length of at the very least half as long again as the length of the plate used, is advisable, and the quality of definition must be such that perfect sharpness can be got at open aperture, but microscopic sharpness all over is not desirable, and lenses which give it are quite unnecessary for bust work.

But the majority of photographers do more than bust portraiture, and their lens requirements are proportionally greater. Single component of R. R.s and anastigmats are sometimes equal to all kinds of portraiture, even including large groups, but for these the complete lens is more suitable on account of its greater speed and better definition. Of the two types the anastigmat should have the advantage of speed, as it is quite possible to get one that will cover most of our requirements at as large an aperture as *f*/3 while the R. R. is usually limited to *f*/8. A biplanat, which is similar to an R. R., can be obtained with an aperture as large as *f*/4. For child portraiture an anastigmat or a biplanat is essential unless we have expeptionally good light available. For flashlight a lens requires to be fast, and to have definition that is at once deep and good. As in bust work, we must also consider focal length. With full-lengths, groups, and outdoor work there is not the same liberty in this respect; for if we choose a comparatively long-focus instrument we will need much room to use it in, and if small premises or outdoor obstacles prevent our getting far enough away from the subject the lens will be useless. If the lens is to be used exclusively in a certain studio, it can be obtained of the longest focus convenient to that studio; but if wanted for outside purposes as well, it should have at least two foci. Lenses of more than two foci are extremely useful for outdoor work as with them it is possible to nicely fill the plate from as many different

distances as the lens has different foci. The shortest focal length should not be less than the short side of the plate. This brings us to considerations of angle of view and covering power. If we do not intend to waste the margins of our plates, the lens must have a big enough angle to illuminate a circle at least equal to the diagonal of the plate. If we require to reproduce detail right up to the edges the angle must be wider than this, so as to keep the picture within the best portion of it. A good lens for group work should give equal quality and depth of definition over the complete plate, and for indoor work it should do this without much stopping down. These qualities can be quickly judged by temporarily fitting the lens to a camera larger than the size it is required for, and focussing up a street scene.

Some photographers use their studio lenses for copying and enlarging. Now while it is possible to obtain a lens with the necessary qualifications for all this work, there are advantages in having a separate lens for workshop use. For this an anastigmat capable of needlepoint definition over a large field is irreproachable. For both copying and enlarging a suitable focal length is one a trifle longer than the length of the negative or positive, whichever is the smaller. For instance, if we are in the habit of copying half-plate prints on to whole plates or larger, or enlarging from half plates, a good focal length will be one slightly longer than 6½ inches. If we are copying only miniatures from larger prints a focal length a little longer than the length of the miniature will do. The same applies to enlarging. At the same time, there is a very wide range in the focal lengths with which it is *possible* to copy or enlarge with, and in the case of large negatives from large originals or enlargements from large negatives it may be impossible for want of bench length to use a long focus lens. The only alternative is a good wide-angle lens, and preferably an anastigmat.

When we come to architectural and engineering work we require lens powers that are not essential for the work already mentioned. Flare, internal reflection, and distortion are now things to be reckoned with, and angle of view, circle of illumination and depth of definition are wanted in larger degree. The amount of flare or light scattering in a modern lens is of no moment to the practical man as a rule. It is so little as to be negligible for all ordinary work, but the commercial worker comes across many extraordinary jobs, and a lens that is suspected of flare should not be relied on for difficult undertakings. The same might be said about internal reflection. A lens with a number of internal surfaces may absorb sufficient light to make it a trifle slower than other lenses of the same aperture. This may not be noticeable on everyday jobs, but when photographing in dark buildings where minimum exposures may run into hours, every ray of light is valuable, particularly the weak ones recording shadow detail, and it is just these that are most easily absorbed. It seems hardly necessary to mention distortion, as obviously a lens that is not rectilinear is useless for general commercial work; but distortion can happen with useful lenses. I remember a lens of a once famous German make, which was in use as a wide-angle instrument. It would certainly illuminate and cover sharply an extraordinarily wide angle, and was used on occasions to the limit of its ability. But the results were not rectilinear, and the lens was eventually relegated to simpler work, and used only at a more moderate angle. A lens for all-round commercial work should have a wide angle of view and an evenly illuminated field of deep definition. Anyone that has focussed up a subject calling for rising front and side and back swing will appreciate this. Without a wide angle and an evenly illuminated sharp field the rising front is useless. Without deep definition, side and back swing are of no value. No one focal length can be recommended, and the experienced commercial worker who is ready for any contingency will have at least three complete lenses of different foci. For half-plate work, 6, 9 and 12 inches are good focal lengths. If convertible lenses are obtained in these focal lengths, the single components will be roughly 12, 18 and 24 inches, and they will come in useful very often, although they must not be expected to have all the qualifications of the complete instruments.

A word about the actual getting of a lens. The simplest way is to write the manufacturer stating exactly what one's requirements are. The next best is to hunt up the right instrument in a good catalogue. But good lenses are often come by in local shops and other studios, but one cannot take such lenses at their face value. Provided the polish on a lens is not rubbed (a scratch or two may not matter, it is the surface in general that must be in condition), and there are no signs of previous mishandling, it is worth while trying any lens that is offered at a reasonable figure. That is, of course, if one has any use for the particular type of lens. But a lens so obtained should be thoroughly tested before purchasing, and if this is objected to the purchase should not be considered further. A maker's name is little to go by unless one knows that the lens bearing it is the same in every detail as when it left the maker. Not very long ago some faulty lenses were sold in mounts that bore a good name, the unscrupulous vendor making a good profit. And a nameless lens is not necessarily a bad one. The very finest universal lens I know, one that is capable of anything from an artistic head to a half-mile of machinery, bears nothing on its mount but the f. numbers.

A lens that is suited to the work required of it is a sound investment at any price, and will prove a good friend for as long as it is cared for.—THERMIT, in *B. J.*

Photographing Hands

IT might be said that the photographer who can photograph hands successfully, and by that we mean one who can photograph them in such a way that they add to the picture, rather than detract from it, has made an unusual success of portraiture.

Aside from facial expression, no other one

thing contributes so much towards the success or failure of a picture to portray the character of the sitter as does the rendering of the hands.

Head and shoulder portraits are often full of character, but we like such pictures because we know the person of whom the picture has been made. Such pictures give us a very poor idea of one whom we have never seen. For that reason the press prefers those pictures which the enterprising news photographer is able to catch of the man on the street, about his home or in his office. Such pictures give a better idea of the man because they show him in comparison with other men and they indicate his size and build and characteristics.

We learn a great deal about hands from paintings, but even more from pictures of prominent people in the illustrated supplements and the magazines. And this will be a fine year for such a study. The papers even now are full of politics, so are the magazines, and from the pictures of those in the public eye an excellent study can be made of hands and their effect on the composition of the picture and the ways in which they depict character.

The photographer who is not clever at posing hands or rather, to put it in a better way, clever in making the sitter unconscious of his hands, does what seems to him the logical thing and tries to hide them.

This is about all that can be done in cramped quarters where a short-focus lens must be used, with the result that the hands, when shown, are usually distorted. But if you have plenty of room and can use a long-focus lens, use it and show the hands.

The position of the sitter doesn't cause distortion; it's the position of the camera, and this is overcome when a long-focus lens is used and the camera is at a sufficient distance to give proper perspective. It isn't necessary, then, to place the hands in any special position or as near as possible to the body. If, however, the sitter is conscious of his hands and is at a loss to know what to do with them, it might be permissible to use a bit of deception and tell him it doesn't matter since you are not including them in the picture. Make him forget them if possible.

Once the photographer realizes what an important part the hands play in the picture—how they show strength, or will-power, or courage, or how they point to artistic traits of character—then the important thing is to give them just the right lighting. If they are shown as two spots of white they will take the attention from the face—if too dark they will not be seen at all. The face should be the center of attraction and the hands of next importance, and they can be used to give proper balance to the picture, aiding materially in composition.

But whatever else you may do in picturing hands, place the camera far enough away from the sitter to prevent distortion. It is far better to hide the hands completely than to have them seem so large that they give the sitter a cause for complaint and make him feel that all photography must be bad because he has had a bad example.—*Photo Digest.*

White Backgrounds

Every now and again we receive applications for a formula for a mixture which can be applied to a background so as to secure the practically opaque deposit on the negative which is the desideratum for sketch portraits. It may, therefore, be said that beyond adding a little blue to the ordinary white distimper nothing can be done in this direction which is of any material advantage. The intensity of deposit in the negative must be secured almost entirely by correct illumination. Very often the background is so lighted that if it were made of freshly fallen snow it would still photograph as gray in the negative. There seems often to be a failure to realize that the soft lighting which the sitter requires to receive for the making of a sketch portrait must not extend also to the background. To get one type of lighting in one place and another in another it is necessary to place the background further away, and by adjustment of blinds (in a daylight studio) or of lamps (in one where artificial light is employed) to secure much more intense lighting on the ground itself. Often enough in a daylight studio the photographer is handicapped by the fact that his glazing does not extend back to the level where the background is usually placed. The conditions then are exactly the opposite of those which are favorable to the lighting of sitter and ground for sketch work. The remedy, obviously, is to bring the background several feet forward, so as to receive ample illumination and to supplement the subduing effect of side blinds upon the sitter by means of head-screens or the like.—*B. J.*

Camera Movements

Occasionally, even in this twentieth century, amusement is caused among photographers by the naive surprise of some people at the total absence of "works" inside even the most expensive camera. For all that it may truly be said that many experienced photographers do not clearly understand the object and use of the various "movements" which usually are all outside the camera. Many produce good results by a sort of instinct acquired rather as a result of long practice than by exact knowledge of how and why a particular adjustment will achieve a desired object. Knowledge of these matters must obviously save a beginner in photography much trouble as well as many plates, and later on will enable him to tackle difficult problems by reasoning out in a logical manner the best and proper procedure to follow, instead of the unfortunately rather prevalent "hit or miss" methods.

There are several distinct moving parts which may be employed separately or in combination to achieve specific objects, and they are quite easy to understand if examined and experimented with one at a time in a systematic and leisurely manner without using any plates at all. In fact, I advise anyone buying a camera to try all its movements carefully in this way before exposing a single plate. I do it myself with every camera I have occasion to use,

although (or perhaps it is *because*) I've been over twenty years "at the game."

Before even trying the "movements" there are a few preliminary facts to be digested, and I put forward also a few suggestions that will be found to make easy the study of the camera's "work." The lens and the ground-glass are the principal parts of the camera. The lens has all sorts of peculiarities, most of which are best left alone by the beginner for a time, but its purpose is to throw such rays of light as reach it from each point in the "subject" to a corresponding point on the ground-glass. The purpose of the ground-glass is to allow the photographer to see whether the lens is doing that or not. The camera bellows and body are to keep all other light off the ground-glass except that which comes through the lens. The "movements" of the camera serve the purposes of adjusting the positions of the lens and of the ground-glass toward one another and holding them in such positions, as well as enabling the ground-glass to be replaced very exactly by a sensitive plate held in a dark slide. The various adjustments are necessary, because to have the lens fixed "pointing straight" at the center of the plate, as in a magazine hand camera, does not suit every subject. A cap or a shutter is for the purpose of admitting light through the lens to the plate for a definite time.

All these things may seem so obvious when put into words that the reader will perhaps wonder why I waste space on them. Yet it is essential that the fact be grasped clearly that it is the lens that does all the "work." The "movements" merely permit one to take advantage of, or control, its various properties or peculiarities.

Before examining how they do this, the suggestions I mentioned as desirable are that the ground-glass should be smeared over with a trace of vaseline, which is then rubbed off again as much as possible. This allows the "image" to be seen more brightly. Next, that a small (but not too small) spirit-level be obtained, as well as a set-square or any piece of flat, stiff material cut accurately to a right angle. The remaining need is for a focussing cloth. This is to wrap round the back of the camera and the observer's head, so that light is excluded and the image on the ground-glass clearly observed. Its essential points are that it must be opaque, not too heavy and ample in size. These qualities are best filled by a double thickness of black "sateen" a yard square. Two yards of this material, folded once and the edges hemmed, make an ideal focussing cloth. With these points and needs made clear we are in a position to examine and study any camera with ease in all its details.

When the reader sees by the list below what a great variety of adjustments there are that may control the respective positions of the lens and ground-glass, he will realize why I emphasized by a whole preliminary paragraph what they are really for, before plunging him into detailed explanations of each movement. Every stand camera has some of these movements; few, if any have them all.

The four main portions of the camera are: The *front*, carrying the lens; the *back*, with ground-glass and grooves for replacing this by a plate held in a dark slide; the *bellows*, which connect the first two and keep all outside light from penetrating, while allowing the parts to move freely; the *baseboard*, which acts as a support for the other parts and may itself be fastened upon a tripod or other stand. When set up in a normal position both the front and the back should be at right angles—both vertically and horizontally—with the baseboard, and therefore quite parallel with one another. This is easily tested with the set-square, and if the camera as bought is found not true in this respect marks should be made so that the parts can be set up correctly and fixed so at any time subsequently. Taking each of the parts separately the list of useful movements is as follows:

Front

Rising (and Falling) Front. Sliding up and down.

Cross Front. Sliding sideways.

Swing Front. Pointing lens up and down.

Side Swing. Pointing lens to one side or the other. (This movement is rarely provided on a camera, but can generally be improvised when required.)

Back

Reversing Back. Allows ground-glass to be placed "upright" or "across." The former is mostly used for portraits, and the latter for landscapes, and is often termed "landscape-way" of the plate.

Swing Back. Swinging toward or away from the front, pivoted either centrally or at the bottom.

Side Swing. Same remarks as side swing on front, but is usually found on studio cameras and on many fixed cameras.

Baseboards

Adjustable Extension. Sliding movement to allow of varying the distance between the front and the back. This may be a single slide either of the front or the back.

Preferably the camera should have a "double extension," *i. e.*, an inner frame sliding forward and carrying the front with it on turning the milled knob of a "rack-and-pinion." This allows the lens to be carried further from the plate than a single-extension camera, which latter is very limited in scope. A "triple extension" allowing of still longer distance between front and back is still more useful, provided that the camera is not so flimsy as to wobble or sag when extended.

Turn-table. This is a revolving metal ring to which the legs of a tripod are attachable. If this is not present there should be a screwed "bush" for attaching to an ordinary tripod top by means of a screw.

Bellows

These have no special adjustments, being flexible, but in long-extension cameras it is usual for there to be rings attached to folds near the middle for supporting the weight of the bellows

at short extensions, and so prevent sagging into the path of the light from lens to plate.

The lens itself has one moving part that should be explained before going into the adjustments of the camera body because it does more to affect the image than almost any other item, and the other movements are always considered in conjunction with this one. That is to say, the other adjustments will either help or hinder the work of this essential one. The part referred to is the "diaphragm" of the lens, a device for making the aperture of the tube larger or smaller. It may be a wheel with holes of various sizes or a set of plates also with different sized holes to slip into a slot, but most lenses nowadays have a built-in "iris diaphragm" which opens and closes on turning a ring or pointer.

Let the camera be set up with front and back "normal," *i. e.*, at right angles to the base, and the lens as central as possible with the plate, opening the lens diaphragm or "stop" as far as it will go, and point it toward some brightly lit objects. On moving the lens or the back to and fro while the observer's head is under the focussing cloth an image will be seen on the ground-glass more or less distinctly. Here let me warn the beginner to keep his head well back and to look *at, not through,* the ground-glass. The sliding to and fro is called focussing, because one brings to a focus, or sharp point, the image on the ground-glass of part of the subject seen. All the subject will not become sharp at one time, because parts which are at different distances require different lengths of extension between lens and plate. The further away the object the shorter the extension required. Beyond a certain distance all things seem sharp without altering the focus, but with comparatively near objects a great deal of movement is required between the points at which the camera gives one object sharp or another. Although this is elementary, I should like to ask the reader to carry out a sort of practical exercise at each stage, even if only to satisfy himself that what I say is true. Reading alone will not fix things in the mind, and I want to get the elementary points well home so as to make it easier for the student to get hold of things that may seem a bit more complicated and not so obvious later on.

When the ''focussing practice," as perhaps I may be allowed to call it, has been tried on several different subjects, distant, near, and near and distant combined; when the sort of images produced by these with the lens at "open aperture" have been observed and carefully compared, as well as the various lengths of extension, preferably by means of actual measuring, let one of the "near-and-distant" subjects be focussed on a point about a third of the distance back from the nearest principal object to the furthest one. Then, while looking at the image, close down the lens aperture, and it will be seen at once how other objects besides the one most sharply focussed become sharp also. At the same time the image becomes much dimmer all over, because less light is allowed through. Therefore in exposing a plate more exposure is needed to make up for the weaker light.

This simple example is put forward not only for the knowledge of the direct effects of "stopping down," as reducing the size of hole is termed, but to show that photography is all through a matter of compromises. As a rule you cannot have a large aperture for short exposures and sharpness of varying distances at the same time. The latter quality is called "depth of focus," and is increased by using a smaller aperture.

The meaning of the numbers of the apertures will be explained later, as they are for use in extimating exposures. Any want of sharpness in the image, due either to the lens itself or to the use of the various movements of the camera being brought into play, can be partly or wholly overcome by stopping down. Sometimes these movements are used to prevent the need for using small stops, where short exposures are essential. These will be taken one by one and explained fully in subsequent articles.— D. Charles, in *B. J.*

Working Against Time

Most professionals are faced now and again with the problem of getting out work at a few hours' notice. Taking photographs for the press nearly always means a rush, especially for the provincial photographer when he makes his exposures during the afternoon and has to get his prints off by the evening mail. Then again, photographs are sometimes wanted in a hurry to produce as evidence in the law courts, especially in cases dealing with ancient lights.

It is usual at such times to dry the negative with methylated spirits, then print in bromide and, when the prints have had a short washing, to dry them in the same way. But it is easily much quicker to make bromide prints from the wet negative, after it has had a rapid washing, say, in nine or ten changes of water. When a little care is used there is practically no risk of spoiling the negative by this method.

After the negative has had sufficient washing, put it in a dish of clean water. Next lay a sheet of bromide paper in the same dish and let it soak until it is quite limp; press the surface of the paper against the film of the negative, under the water in order to avoid air-bells, in the same way as you would transfer a carbon print from an opal temporary support to the final base. Now lift the negative with the paper in contact from the water, and lay them, paper side uppermost, on a large sheet of glass or a perfectly flat board; lay over them a sheet of blotting paper folded in two, and run over very lightly three or four times with a roller squeegee. The next step is to lift the two very carefully and lay them down again on the same glass or board, this time with the glass side of the negative uppermost. Wipe all water or markings from the glass of the negative with a clean duster.

Everything is now ready for making the exposure. For this there is no need to put the negative and paper into a printing frame; the

paper is in perfect contact with the negative and moving the two into a frame would only mean a risk of shifting the paper or of damaging the soft film of the negative. The best way to make the exposure is to hold a lighted taper or wax vesta about five inches above the negative. The exposure, with a negative of average density, will only be about six or eight seconds, if a bromide paper is used. The taper or vesta, of course, should be moved about in order to expose the paper evenly.

After the exposure, again put the negative and paper into clean water, and strip off the paper. The print can now be developed in the usual way.

After fixing, the prints should have about ten changes of water. They can then be well blotted and put into a dish of methylated spirits, and allowed to soak for from five to ten minutes, or until the image is visible through the backs of the prints. When taken out of the spirits they should be well pressed between sheets of dry fluffless blotting paper and then dried over a gas ring or in front of a fire.

It is not wise to attempt more than six prints from the same negative by this method, because, by the time you have printed that number, the film of the negative will have become so tender that it will not be safe to risk any more copies. If more are wanted the negative should be hardened in an alum bath.

If the negative is valuable and likely to be used again, it should be put back in the fixing-bath and afterward thoroughly washed in the usual way.—*Professional Photographer.*

Keeping Your Promises

WHAT about the promises you make customers?

This isn't mere curiosity; it's just a question you might ask yourself. If you can answer that you don't make promises unless you are sure you can fulfill them—why, it hasn't the least bit of impertinence in it.

The ancient saying that "promises, like pie crusts, were made to be broken," has been retired on an old-age pension. The man or the firm that attempts to do business with hot air doesn't get anywhere. And unfilled promises are the worst kind of superheated atmosphere.

We are all guilty, at times, of longing to push truth back into her well, and promise what we must know—back in our heads—that we can not quite live up to.

But as long as you fight this unworthy desire and have the mental grit and the psychological stamina to say you will deliver the job not a day sooner than you know you can, you're well on your way to earning a reputation that is worth money.

If you get in the habit of delivering the goods on time, you won't have to deliver excuses.

Every promise kept, makes the next one easier to keep.

Neatness in the Studio

TAKING it all round, we are inclined to think that the photographic studio is the most difficult place imaginable to keep clean and tidy. Do what you will, the general effect after taking a few sitters is more reminiscent of a rag shop than the most important room in a presumably artistic establishment. Certainly, public opinion rather expects untidiness in such a place; but a lady client in an expensive dress would much prefer cleanliness, while orderliness is essential if operating is to be conducted with any degree of comfort and despatch. When one is obliged to store canvas palaces and weird woodland in one and the same place, as well as broken balustrades, stone steps, garden seats, oak settees, several varieties of chairs, not to speak of the amount of space occupied by small headgrounds and reflectors, the general effect is bound to be somewhat incongruous.

Try as one will, it is impossible to carry out the theoretical idea that a studio should resemble an ordinary room. To secure the most pleasing results, both in the sitter's expression and subsequent order, every effort should be made to make the studio as inviting as possible. Many people are affected to a remarkable extent by their surroundings, and most are more susceptible than usual when visiting the photographer's, for even now our craft is still tinged with the mystery of the unknown.

It is essential that the general scheme of decoration be extremely reserved and subdued, and as harmonious as possible. A bold scheme, however pleasing it would be in a private room with a carefully selected suite of furniture, would appear merely as a discord when so many varying articles are collected within it. The usually advised gray walls we do not care for: they are too cold, and likely to prove quite out of keeping with any upholstery. It may, however, be necessary to use this color if the studio is narrow and reflected light essential. When a free hand can be taken, a green or a brown scheme appears to us to be much more cheerful and has the advantage that drapery, curtains, etc., can easily be obtained to match. To make a studio at all presentable every opportunity of securing repetition should be taken in order to give the general appearance a feeling of unity. Variety there will be and to spare without seeking for it. If the walls are plaster, a good matte paper, devoid of pattern, should be used with perhaps a quiet stencil for frieze. Many studios have matchboard partitions; than which nothing looks worse. They are, however, remarkably easy to treat, since anyone of average intelligence can apply a fabric wall-covering, skirting board, and picture rail to such an amenable base. The art canvas in various colors supplied at about seventy-five cents per yard of fifty-two inch wide may be stretched and tacked in position or the fabric hangings sold under various fancy names and prepared for pasting on the wall may be used. They are only thirty-six inch wide and more expensive per yard, but we find them very much more durable and really easier to hang. If the ordinary art canvas is used, it is essential that the matchboard be first papered over, preferably on both sides of the partition, with some cheap paper; ordinary brown will do. If this is not done, dust will work through the

joint of the boards and make dark streaks on the canvas. The doors and other woodwork should be painted a shade darker than the wall covering, but never have the doors picked out in two shades.

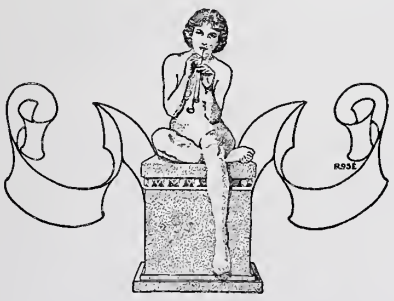
Floor covering is another important item. Without any hesitation we recommend a good linoleum. It is easy to keep clean, castors on the various accessories run easily on it, dropped chemicals will not affect it, if good it is extremely durable, and, lastly, thoroughly artistic designs can now be had. Linoleum is very warm and elastic to the tread, but we find the colors apt to become dirty and degraded in parts. We do not care for perfectly plain, self-colored floor-cloths, since they are monotonous and show the dirt badly. Any bold pattern is to be avoided, especially geometrical and floral designs. A small indefinite pattern of a slightly darker or lighter shade than the ground are quite inoffensive; but, as a general rule, at the risk of being called over the coals by the purists for advising an imitation, we cannot conceive a more admirable material than inlaid linoleum in simple parquet designs. Of course, a real parquet floor is the height of one's ambitions, but very few photographers are in a position to, or would be justified in, having one laid. When selecting a design, it must not be forgotten that parquet patterns are innumerable, and that the majority are unsuitable for photographic purposes. One or two small rugs will be required to break up the floor space, and if of an almost plain design will be useful for interiors. Here, again, we prefer to match the general color scheme rather than employ Oriental rugs, rich as they appear to the eye, but totally unsuitable for inclusion in a picture.

The skylight shades are usually black, and this from practical motives is advisable. Any other curtains, however, should be in a plain, unpatterned material of the prevailing color. In place of the usual black camera cloth, we have one made out of the same fabric as our curtains.

The trite old saying, "A place for everything and everything in its place," should occupy a prominent position in that imaginary spot known as one's mind's eye. It will often be found that orderliness and neatness take the place of muddle merely by changing about the usual position of accessories: this stool will go under that chair, this chair under that table, and so on. It is foolish to keep any unused lumber; its room is of greater value.

Backgrounds are perhaps the most insistent sign of photography in the studio, and too often their general appearance brings them into undesirable prominence. One of the first moves in the improvement of the studio should be some neat and compact system of storing the grounds. The rolled-up ground does not look particularly pretty, and we find it adds to the appearance if a wide piece of moulding, preferably on the same level as the frieze moulding, is fixed in front of them to hide them when rolled up. Grounds on stretchers are ungainly and very frequently an eyesore, owing to ragged edges, crooked rows of tacks, and bare white strecther or stretcher edges showing. The two latter defects are overcome by painting the frame before stretching the background, and the two former by tacking three-quarter inch black tape over the lines of tacks and cutting off any ragged edges of background not covered with a sharp knife.

After executing these permanent aids to neatness, the more frequently needed attentions of the scrub lady should not be forgotten. The floor should be washed at the very least once a week, while the upholstery should be brushed, and the camera, furniture, and ornaments dusted every day. Above all, do not leave lying about stray negatives, printing frames, prints, drying racks, mounts, blotting paper, or any of the manipulative branch of the work. Of course some studios are obliged to use the studio as a general workroom, but some scheme should be devised to keep such signs of one's business as unobtrusive as possible.—*B. J.*



VIEWS AND REVIEWS

Report of the National Convention

It is generally conceded that the National Convention at Milwaukee, "The Better Business Convention," was one of the best ever held. The attendance of photographers, manufacturers and dealers was about seventeen hundred, and exceeded expectations. The weather was all that could be desired and added much to the comfort of everyone. The rather extensive program was carried out. Dues were raised to $10.00 a year for active and $3.00 for associate members. ($2.00 for manufacturers and dealers). The code of ethics was included in the constitution. The new officers are:

Howard Beach, Buffalo, N. Y., President.

J. L. Hostetler, Des Moines, Iowa, 1st Vice-President.

A H. Diehl, Sewickley, Pa., 2d Vice-President.

Clara Hagins, Chicago, Ill., 3d Vice-President.

Clarence Stearns, Rochester, Minn.

Eleven Salon honors were awarded by the Judges, Pirie MacDonald, S. L. Stern and Eugene Hutchinson, to the following:

Frank Scott Clark, Detroit, Mich.; The Gerhard Sisters, St. Louis, Mo.; T. Kajiwara, St. Louis, Mo.; Strauss-Peyton Studios, Kansas City, Mo.; Richard T. Dooner, Philadelphia; the late Pasquale Culotta, of Baltimore, Md.; Will H. Towles, Washington, D. C.; Elias Goldensky, Philadelphia, Pa.; Lejaren a' Hiller, New York City; Howard D. Beach, Buffalo, N. Y., and Francis J. Sipprell, Buffalo, N. Y.

The Interstate Trophy was won by the Missouri Valley Association with Missouri Valley, Ohio, Mid-Indiana, North Central and Middle Atlantic States Associations competing.

The next place of meeting was left for the incoming board to decide. President Lewis and his associated officers deserve great credit for the fine and successful management of this big convention.

The Commercial Photographer

L. G. Rose. Profusely illustrated. 150 pages. Cloth, $4.00; postage, 15 cents. Frank V. Chambers, publisher, 636 Franklin Square, Philadelphia, Pa.

The papers contained in this volume orginally appeared in the *Bulletin of Photography*. The great demand for extra copies of this journal prompted the publisher to issue in book form for the convenience of the reader, and to further extend the circulation of a publication to the commercial photographer. For hitherto but little in book shape has been available for reference in this most important branch of the professional photographer.

The author is thoroughly competent to give valued information from extended experience in every department and from personal application in many of the various branches included in this particular photographic work. And, of a consequence, the subject is treated in a way which shows that the writer appreciates the importance of considering all the detail essential to success which might be overlooked by one not so thoroughly conversant with the topic.

The subject is discussed under different heads, in a clear, concise way, which takes particular account of the necessary appliances, apparatus, lenses, character of plates, exposure and whatever else is necessary for the production of the best work. Then the important feature of illumination is considered and the best manner of arranging the subject so as to present the features in a way interpretative of its character, and in a manner the most attractive, an important consideration sometimes not sufficiently regarded by the photographer.

A perusal of the contents shows at a glance the exhaustive way the subject is handled, and the direct manner of conveying the information shows forcibly that the purpose of the author has been to enter particularly into such detail in manipulation which the practical worker knows to be of essential worth to him in furnishing such means which his limited experience demands, when an operation is undertaken with which he is not familiar.

We do not know of any other book on this subject which covers so much ground or which conveys so much definite information, and the demand for it will be very extensive, and we predict that this first edition will be speedily exhausted and therefore caution those interested to secure copies of *The Commercial Photographer* in time and not be put to straits waiting for another issue.

Bertram Cox Exhibition

An exhibition of forty-three examples of the work of Bertram Cox, F.R.P.S., of London, England, opened at the Camera Club, New York, on September 1, and will continue until October 15. The prints exemplify the bromoil process, in which Mr. Cox is a master. They are 15 x 12 in size. They are attracting an unusual attendance and interest, for this is the first one-man show ever given in the United States, as far as we know, of any of the foremost British or other European workers.

Mr. Cox as a technician is among the best, and is particularly happy in delivery of expression, subtleties and the manner in which he

blends and melts his tones. An evenness of quality is a distinguishing feature of his work, this being apparent both in his earlier and latest examples.

His exhibit comprises quite a number of his published pictures, and those exhibited at the Royal Photographic Society and the London Salon, as well as society exhibitions throughout the United Kingdom, which is interesting, particularly to many here who, while abroad, have seen them on display at such times and when given to the public in one-man shows.

So excellent are these pictures that it is difficult to distingush the best—they are all of outstanding merit. Still, were a designation required, we should mention: "At Weybourne, Norfolk," "An Evening in June," "Grawsworth Common," "Lincoln from the South," "Bradford, Lincoln," "A Day's Work Done," "Tuesday Market Place, King's Lynn," "Broadgate, Lincoln," "Runton Gap," "Brothers of the Brush," "An Inn at Knutsford," "At Ely," "To the Sea," "The Cheshire Plain," "The Little 'Ouse," "The Bishop's Eye, Winter," and "Sudden Storms are Short."

New Rexo Dupli-kit

THE Rexo Dupli-kit is a thin metal mask which fits in the back of the camera over the bellows frame and masks off the opening so that a picture one-half the regular size will be obtained when Rexo Speed Film is used.

With this mask twelve pictures half the regular size are made on a six-exposure roll, twenty on a ten-exposure roll, and twenty-four on a twelve-exposure roll.

No special attachment or extra ruby windows are required. The black paper used on the Rexo Speed Film is printed with an "X" between each exposure. This shows where to stop to obtain half-sized pictures. Full instructions for use with each Mask.

The Rexo Dupli-kit System can be used in all popular hand cameras with a Rexo Dupli-kit Mask and Rexo Speed Film of the corresponding size.

Lens Cleaning Tissue—A New Wollensak Product Designed for Proper Cleaning of Photographic Lenses

THE proper cleaning of photographic lenses is a thing that sometimes puzzles even the best of photographers.

A very satisfactory method of cleaning lenses is through the use of Japanese tissue which is made from the bark of the Japanese Mitsumata. This tissue is free from any abrasive and so proves very satisfactory for cleaning purposes.

These booklets are put up in convenient form 4 x 6½ in size with sixteen pages of tissue to the book. They also include suggestions for the proper cleaning of lenses which will be found of definite assistance to the photographer. They can be obtained at all dealers in photographic supplies.

Photo-Engraving Primer

STEPHEN H. HORGAN, American Photographic Publishing Co., Boston, Mass. Price, $1.50 net.

This book is a primer. It contains concise instructions for apprentice engravers or for those seeking simple yet practical knowledge of line and half-tone engraving. Its author, Stephen H. Horgan, has long been known as an authority on the subject as editor of "Process Engraving" in *The Inland Printer* and author of Horgan's *Half-tone and Photo-mechanical Printing Processes.* Every phase of photo-engraving is made clear, and there is a complete glossary of terms and index, which makes this primer quite complete. We are glad to recommend it to all interested in this subject.

How to Avoid Blisters

FRESH solutions are essential. Do not use developers containing strong alkali and avoid forced development.

Be sure that the acid short stop is reasonably fresh.

The fixing-bath should be carefully made according to formula and it is of the utmost importance that this bath be not overworked. Three gross of 4 x 6 paper or equivalent are a sufficient number of prints to fix in one gallon of freshly made bath.

The toning should be accomplished as soon as prints are fixed. If a delay is necessary, it is advisable to wash long enough to remove excess hypo and dry the prints in black and white rather than to allow them to soak for an indefinite period, thereby causing the paper stock to become softened.

The temperature of the toning bath should not exceed 120° F.

When toning is completed, place prints on a glass to drain and permit gradual cooling, then sponge to remove sediment from toning bath.

Wash for thirty to forty-five minutes. Dry as usual.

Suggestions

IF we are to make a success of our studios today we must realize that in this, the twentieth century, great strides have been made artistically. The early Victorian and art nouveau are things of the past, and what would have been accepted a few years ago will not be looked at now. Not only is it necessary to keep our pictures up-to-date, but also our studios and displays. Remember, a blank wall is much better than out-of-date specimens. It is a good plan to go through your specimens carefully at least once a year, and do away with any from which you have not received any orders, or which look old-fashioned, either because of the costumes worn or the accessories used; but whatever you do, do not shift them to a darker corner of the room, or into the dressing-rooms, or on the staircase. Be brave and scrap them, for by showing a lot of out-of-date pictures, you are seriously depreciating your up-to-date work, from which you are actually taking your orders.

Price-List Adopted by Chicago Commercial Photographers

Exterior Photographs

8 x 10—Within 3-mile limit.	$5.00
8 x 10—2d exposure, same trip.	3.50
11 x 14—Within 3-mile limit.	7.00
11 x 14—2d exposure, same trip.	5.00
Time waiting, per hour.	1.50

Interior Photographs

8 x 10—Time exposure and artificial.	$6.00
8 x 10—2d exposure, same trip.	4.00
11 x 14—Time exposure	8.00
11 x 14—2d exposure, same trip.	6.00

When flash or electric lamps are used a charge of $1.00 for each extra light will be made.

When flash bags are used a charge of $1.50 for each bag will be made.

For work beyond the 3-mile limit, add $1.00 to the first exposure price for each additional three miles traveled from the studio.

Photographs Made in Studio

5 x 7	$2.00
8 x 10	3.00
10 x 12	3.50
11 x 14	4.00

Preparation and set up in excess of ½ hour for each exposure will be charged at $1.50 per hour.

Copies

5 x 7	$1.50
8 x 10	2.00
10 x 12	2.50
11 x 14	3.00
14 x 17	5.00
16 x 20	6.50
18 x 22	8.00
20 x 24	10.00
Yellow color correction	25% extra
Red color correction	50% extra

Commercial Subjects and Flat Copies Made Outside Studio

For the first exposures apply the first exposure rate for interiors or exteriors, as per conditions prevailing, making sure to charge for any additional mileage.

For the additional exposures apply studio scale for commercial subjects or flat copies, as the case may be; subject to such extra charge for preparing, posing and color correction as covered in studio prices.

Real estate exteriors in lots of 10 or more within city limits, to be made at our convenience, may be charged at flat rate as per additional exposures.

Graflex or press work within three miles of the studio, $10.00 per assignment, including 2 or 3 exposures.

$3.00 for each additional exposure made at same time and place.

For Out Of Town Work

Transportation expenses en route and hotel expenses to be paid by customer.

A charge of $15.00 per day to be made in addition to regular city prices for all photographs made.

Miscellaneous

For lost trips and time waiting beyond appointed time, as well as time waiting between a series of exposures to be made, a charge of $1.50 per hour will be made.

For blocking, etching and lettering, charge $1.50 per hour.

A charge of $1.50 per hour, to cover overtime, will be made on all assignments outside of regular business hours.

For surrender of negative a charge of one-half of rate for photo made in studio, will be made.

Bromide Enlargements.

Black and white enlargements 6-10c. per sq. inch; minimum, 75c.

Sepia enlargements 25 per cent. extra.

Mounting extra—Same price as for contact prints.

Lot of 6 prints from one negative.	10%
Lot of 12 prints from one negative.	15%
Lot of 25 prints from one negative.	20%
Lot of 50 prints from one negative.	25%
Lot of 100 prints from one negative.	30%

Unmounted Prints—Single Weight

Number of Prints from One Negative

Size	1	6	12	25	50	100	500	1000	Add for mount'g: Cloth	Add for mount'g: Cd' bd.
4 x 5	$0.10	$0.09	$0.08	$0.07½	$0.07	$0.06	$0.05½	$0.05	$0.04	$0.08
5 x 7	.25	.20	.15	.12½	.10	.08	.07½	.07	.05	.10
8 x 10	.50	.40	.30	.25	.22½	.20	.17½	.15	.07	.15
10 x 12	.60	.50	.40	.30	.25	.22½	.20	.17½	.08	.20
11 x 14	.85	.70	.60	.50	.40	.35	.30	.25	.12	.25
14 x 17	1.25	1.00	.85	.75	.65	.60	.55	.50	.18	.35
16 x 20	1.75	1.50	1.25	1.00	.85	.75	.70	.65	.25	.50
18 x 22	2.25	2.00	1.75	1.50	1.35	1.10	1.00	.90	.35	.75
20 x 24	3.00	2.50	2.25	2.00	1.75	1.50	1.35	1.25	.50	1.00
Postals						.07	.05	.04		

For printing on double weight paper add 25 per cent. to list for unmounted prints.
For Sepias on single weight paper add 25 per cent. to list for unmounted prints.
For Sepias on double weight paper add 50 per cent. to list for unmounted prints.

The WORKROOM

CONTAINING THE LATEST PROCESSES, FORMULAE AND APPLIANCES NEEDFUL IN THE ART OF PHOTOGRAPHY FOR THE OPERATOR & WORKER

THE WORKROOM

By the Head Operator

Photographs on Opal and Ivory

PRINTS upon opal or ivory may be produced in the same way as for watch dials. The only difference for opal or porcelain is that after the plates have been cleaned in a hot soda solution they must be coated with albumen as follows:

The albumen of one egg, one ounce by measure, is broken up with a silver fork in a teacup. One ounce of water is added and one dram of strong water ammonia, beaten well again, then added to one quart of water in a suitable bottle. Shake well, then filter a few ounces of this through absorbent cotton. The opal plate while wet is coated with this weak albumen solution and dried in a rack.

A print is made upon the stripping paper, toned, fixed, washed, temporarily attached to a piece of plain paper and pressed into contact.

The opal plate is then coated with plain collodion (*Solution A*), drained, and as soon as the collodion has set, which takes about half a minute, it is placed in a tray of cold water and allowed to remain until all greasiness has disappeared.

The photograph to be transferred is dipped into warm water as already described and the paper base of the print made to slide off. The moist surface of the print is then placed in contact with the wet collodion surface, a piece of waxed paper placed on top and rubbed down with a soft piece of cardboard. As soon as this is done the back is rubbed down with dry blotting paper and the opal together with the temporary backing is stood up cornerwise to dry. When quite dry the paper backing can be removed with ease if it has not already loosened itself. This very effective print upon opal is now coated with the gum solution, dried and given a coat of Kodalak W. P., although if desired it may be left unvarnished.

To transfer to ivory the ivory is cleaned with a very weak solution of ammonia, then coated with the gum solution, dried and the photograph transferred in the same way as for opal, with this difference: A piece of waxed paper is used in place of plain paper. As soon as the transfer has been made and the excess of water blotted off the ivory, with its waxed paper backed photograph, is placed between two pieces of thick blotting paper in a printing frame on a piece of stout glass and kept under pressure until dry, which requires from 30 to 40 hours. During this time the damp blotters must be changed for dry ones. At the end of this time the backing paper may be removed when the print may be colored as is usual with such pictures.

The next novelty by this process is not so practical but it is a novelty in the true sense of the word: It is the transfer of these miniature photographs to a thumb nail. We often hear of thumb-nail sketches, but these are actual thumb-nail photographs.

A miniature photograph, such as is placed upon a watch dial, must be made and it must be small enough to fit the nail nicely. No preparation is necessary except to have the nail clean and lightly scraped to give it a matte surface without polish.

The miniature print having been made ready for transfer, slide off the original paper, then place the photograph down upon the thumb nail, carefully pressing the supporting paper so that a good contact is made. In the course of a minute of two the paper may be removed, and as soon as dry the picture should be coated with the gum solution. When this is dry, coat the nail with Kodalak W. P., dry and coat again. If care is used a picture of this kind will last for several weeks. Care should be used when the hands are washed as such a picture will not stand rubbing. There is little danger from water, however, as the Kodalak makes the picture waterproof.—ALFRED J. JARMAN, in *Photo-Digest.*

One of the Principal Causes of Fading in Photographs, and a Reliable Mountant

WHEN one looks back over a period of about thirty years in the line of photography and examines the various kinds of prints produced, it will be noticed that large numbers of these photographic impressions have not only turned yellow, but have almost disappeared from the paper.

Among the photographs produced in years past, by far the largest number were made upon albumenized paper prepared and sensitized in various ways. There were many ways of making up an albumenizing solution, many photographers adhering to their pet formulæ. In the cases where ammonia was largely used, particularly in preparing the nitrate of silver bath with ammonia nitrate of silver, although prints could be rapidly made upon paper sensitized with such a solution, the paper being extremely sensitive to light, these prints have, in the large majority of cases, faded almost beyond recognition. The plain prepared albumen papers, containing only the chlorides of silver and sensitized upon a plain nitrate of silver bath, are the prints that have withstood the ravages of time far better than any papers treated with ammonia.

The plain salted papers used previous to albumen have in some cases withstood the action of the atmosphere and time, but only when treated and prepared in the simplest manner with chloride of silver and a plain nitrate of silver sensitizer.

In a book published by the late Henry Fox

Talbot, *The Pencil of Nature*, the illustrations were made upon plain salted paper. These prints have withstood the test of time for fifty-one years, and, strange to say, have not faded except where they were held by paste at the corners.

The strength of the nitrate of silver bath used to sensitize this salted paper was 125 grains to the ounce of distilled water, and fixed by prolonged soaking in a solution of sodium chloride (common salt). Hyposulphite of soda as a fixing agent had not been discovered at this early date. It was not discovered that hyposulphite of soda proved to be a fixing agent for papers containing the salts of silver until March 14, 1839, by Sir John Herschel. A point is now reached that proves beyond question that one of the principal causes of the fading of a photograph is due to the paste employed as a mountant. The above-mentioned prints, made by Fox Talbot, prove this, while today it is also well known that the mountant is a cause of fading in collodion papers, as well as many others.

Freshly-made starch-paste has been the mounting material almost invariably employed, yet it is well known that prints of nearly every kind have shown signs of fading in a very short time after being mounted with such paste freshly prepared, while other prints so mounted have withstood well the action of time. Prints by the thousand have faded from the effects of hyposulphite of soda contained in the paper forming the card-mount, this chemical being used as an antichlor, so termed by papermakers to correct the chlorine compounds employed in bleaching many of the white commercial papers.

Assuming that the prints have been toned, fixed, and washed correctly, the most important item required next is a good, reliable mountant. When ordinary starch or flour-paste is used, time and again, when fading sets in, the marks of the brush employed in pasting become visible through the print, and show up in a manner most marked upon the surface of the print. This sometimes happens in the course of fourteen days, the marks being very decided at the end of a month. The writer has albumen prints in his possession, made thirty years ago, mounted with a special starch paste. These prints are not in a faded condition at all. It is not unreasonable to presume that they are likely to last another thirty years, and be in good condition. One of the principal causes of mounted prints fading is the imperfectly-made paste used for such mounting. When the paste is imperfectly cooked a process of fermentation sets in known as acetous fermentation. This will also commence in paste that has been well cooked after a few days. The result will be that if photographs are mounted with such paste, the acid products of the fermentation will attack the organic compound of silver that forms the photographic image. It will make no difference whether the image is in a collodion film or not, fading will set in and the image will eventually disappear.

The following method of making a mountant has withstood the test of many years. Not a print has been known to fade where it has been employed.

In the first place an enamelled iron sauce pan must be kept for paste-making only, of the capacity to suit requirements. Proceed as follows: Pour into a clean saucepan, described above, say 3-pint capacity, 4 or 5 ounces of filtered water. Add thereto 2 drams of salicylic acid. Place the saucepan with its contents over any source of heat, so as to bring the water to boiling point. This is to dissolve the salicylic acid. It will not be necessary to stir this, only to remove the saucepan and shake it around. Add to this 1 pint or 20 ounces of cold water. Weigh out 5 ounces of common laundry starch. Place this in the saucepan; then stir well with a clean stick or silverplated spoon until the starch and water are well incorporated. Place the saucepan over, say, a gas-heater and continue the stirring without intermission until the mass commences to thicken. Now stir rapidly and remove the saucepan. Still continue the stirring for a short time and pour the contents into a clean basin, scraping the remainder of the contents of the saucepan into the basin. Stand aside to cool, which usually takes several hours. When quite cold (not before) lift the thick skin that forms upon the top and throw it away; then wring the cold paste through a piece of clean-washed cheesecloth into another basin or jar. The paste will present a pink appearance. This is of no consequence. All is now ready for use. Paste made as above possesses a structure altogether different from ordinary paste. Its sticking qualities are excellent. No acetous fermentation whatever will take place and no fear of fading. To remove a print when once fixed with the above is almost impossible.

Carbon Prints on Daguerreotype Plates and Aluminum

One of the most beautiful products of the carbon process is a finished print upon a highly polished silver surface, such as that of the Daguerreotype plate. These pictures have already been called the twentieth century Daguerreotype. Although the surface may be matted so as to give a delicate diffused whiteness, the result is not so effective or attractive as the mirror-like surface of highly polished silver. A copper plate may be electro-gilded and polished to a high degree, and the carbon print developed thereon by the single-transfer process or by double transfer, yet the effect is not so pleasing as the silvered surface of the Daguerreotype plate.

Method of Production

The easiest and best method for the production for this kind of print is to employ the single-transfer process. In this case a reversed negative is necessary, and this can be produced in four different ways. First, by a reflecting prism; secondly, by reversing the film, removing it from the negative and remounting it upon a clear glass plate in a reversed position; thirdly, by the use of a celluloid film for the negative, obtaining the reverse by printing through the film, and fourthly, by reversing the sensitive plate in the plate-holder.

If the film must be removed from a glass negative for the reversal, it will be found better to

transfer it to a piece of clear celluloid, the surface of which has been well cleaned and prepared by coating with a thin solution of gelatin—ten grains of gelatin to one ounce of water. The stripping of the film from a gelatin negative is easily accomplished by making up the following solution of chrome alum; twenty grains of commercial chrome alum to each ounce of water. Allow the negative to soak in this for twenty minutes to thoroughly harden the film and prevent after-expansion. After this treatment the plate must be well washed in running water for ten or more minutes. When dried make up the following:

Fluoride of sodium (commercial)	½ ounce
Citric acid	¾ ounce
Water	10 ounces

As soon as the salts are dissolved take equal parts of each and mix them in a hard-rubber tray (not glass or porcelain); insert the negative and rock the tray. In three or four minutes the film will pucker around the edges. Now take the top edges of the film with the forefinger and thumb of each hand, lift it carefully from the glass and dip it into clean water; then while still wet lay it down upon the celluloid, the face of the film being reversed. The film is easily adjusted upon the celluloid by means of a camel-hair brush; any air-bubbles may be removed by stroking the surface with a flat camel-hair brush; this will also squeeze out any superfluous water. The celluloid must now be pinned down upon a clean dry board and remain in a horizontal position until dry. In this case the celluloid negative will be printed with the film side direct upon the carbon tissue, instead of printing through the film. The film when once stripped may be transferred to a glass plate in the same manner.

The Silver Plate

Having the reversed negative now ready the silvered plates must now be prepared and polished. The easiest way to procure these plates is to obtain what is known as reflector plate; this is very smooth copper plate silvered on one side ready for polishing—this can be readily done by any electro-plater at a small cost. Take the plates, one at a time, holding them at one corner with a pair of pliers; dip the plate into a solution of potash lye or a strong, warm solution of common washing-soda; rub the surface over in straight lines with a tuft of absorbent cotton pressed into the end of a six-inch piece of india-rubber tube; the rubbing must be done very lightly so as not to scratch the surface of the plate. Rinse the plate in cold water; observe whether the water stands upon the bright surface without showing any greasy appearance—if so the plate is clean. As soon as the plate is washed pour over it a few ounces of distilled water; this forms the last rinsing, the object being to create such a clean surface that there shall be no organic matter or lime left in the few drops that remain upon the surface when drying and thus mark the surface. The plates may now be stood aside to dry, away from sulphurous fumes. If only a few plates are to receive treatment, it will be better to carry out the cleaning as above described, and flood the surface of the still wetted plates with a plain warm solution of gelatin, ten grains of gelatin to one ounce of water, then allow to dry; those that are cleaned and dried without the gelatin coating are to be coated with plain collodion, this being an alternative method of preliminary coating before the printing issue is attached.

Sensitizing is carried out by preparing a bath of sensitizing solution as follows:

Bichromate of potash (c. p.)	1½ ounces
Water	50 ounces
Carbonate of ammonia	20 grains
Glycerin	2 drams

As soon as the crystals are dissolved, filter the solution through absorbent cotton into a clean, wide-mouthed, amber bottle; this done, pour the mixture into a clean tray (carry this work out under artificial light), and put into it a piece of carbon tissue, about 8 by 10 size portrait brown in color, completely immersing it, face down; then turn it over and brush the surface over with a flat camel-hair brush to remove the air-bubbles; then turn the tissue over again, face down, and allow it to remain for three minutes from the time of the first immersion; then remove it and lay it face down upon a sheet of clean glass 11 by 14; place upon the back a piece of thin India-rubber cloth and apply a squeegee, holding the cloth at one end with the left hand, applying the squeegee with the other; as soon as the excess of bichromate solution has been squeegeed out lift the cloth and wipe the back of the tissue with a piece of soft rag; lift the two top corners of the tissue, insert the tips of two photographic clips, lift the tissue and suspend it upon a stretched wire in a dark room to dry.

If the tissue is prepared in the evening it will be perfect-dry the next morning. No light except a ruby or deep-orange light must be allowed to reach the tissue, as it is now very sensitive. It may be cut into pieces the size required.

The negative must now be masked with a piece of black paper, the hole being cut three inches by four; this is to allow one-eighth of an inch for the safe edge. The piece of tissue, 3¼ by 4¼, is now placed upon the masked negative in an ordinary printing frame just the same as for ordinary sensitized paper, the back adjusted ready for exposure. In exposing take another negative of about the same printing qualities as the negative to be printed in carbon, place upon this negative a strip of sensitized printing-out paper and put the two frames out to print in bright daylight; after a short time turn both frames over, removing the strip of paper as soon as it is about one-third as deep as it ought to be for a finished print. Repair to the dark-room, remove the tissue and place it in a light-tight box, and continue the printing until the required number of prints have been made.

Development

Development may now be proceeded with in the following manner: two trays 11 by 14, made of hard rubber or composition, and two enamelled iron trays the same size are necessary. Make up a solution of common alum, two ounces of powdered alum to twenty ounces of water, and filter; this is best made with hot water and allowed to cool. Place this in one of the hard-rubber trays, half fill the second tray with cold water and immerse the printed tissue in the water; allow it to remain until it lies nearly flat; remove and dip it into a clean mixture of sugar and water, half a pound of sugar in ten ounces of water (in fact, white syrup). Take one of the silvered plates that has been coated with the gelatin solution, wet it in clean water, dip it into the sugar solution and lay it down upon a clean, smooth board, face up; then place the tissue upon it, face down; adjust it in position, cover it with the rubber cloth and apply the squeegee, at first lightly, then increase the pressure, but do not stroke the squeegee too quickly—a slow even pressure is best. Now lift the cloth, lay the plate with its tissue aside and treat the others in the same way, placing a piece of thick blotting-paper between each as they are stacked and allow them to stand for twenty minutes. Then place them in one of the enamelled iron trays containing lukewarm water; let them remain in this for five minutes; take one of them and dip it into the second tray, containing water somewhat hotter. In a short time the coloring matter will be seen to ooze from the edges of the plate. Now take hold of one corner of the tissue and lift it carefully off the plate beneath the water; throw this into the waste box and proceed to develop the print upon the plate by holding in the left hand while in the water, and throwing water over it with the right. The temperature of the water must be kept up by the addition of more hot water. In the course of a few seconds the print will be seen to stand out upon the plate, and in the course of about one minute the development will be complete.

The print now must be washed in a soft stream of running water and placed in the alum bath for one minute. It is then rinsed again carefully under the faucet and laid to soak in a tray of clear water for a few minutes or so to get rid of the excess of alum. It must now be rinsed for a few seconds under a stream of water and stood in a clean rack to dry. The other plates that have been soaking in the warm water can be taken in hand in the same way, in fact they must not be allowed to remain in the warm water too long before removing the tissue, as the plates are liable to become marked.

The effect produced is charming in every particular. Before you is a picture with all the beautiful gradations of tone as in the Daguerreotype, the shadows being semi-transparent, the beautiful reflection of light in the high-lights from the bright silver surface beneath, and above all there is an absolutely permanent picture upon a silvered surface. As soon as the print is perfectly dry it can be spotted if necessary and then varnished with a clear varnish, the formulæ for which will be given herewith. Do not use a chrome-alum bath for the semi-hardening of the print, this salt being liable to make the film too hard and cause it to crack; use the common powdered white alum.

In employing the alternative process, where the plate has been cleaned and dried, about half a pound of plain collodion will be required. In this instance the plate must be coated with collodion by pouring a pool on the centre of the plate and allowing it to run to each corner; then drain the excess back into the bottel. In the course of about half a minute place the plate, face up, in a tray of clean water; allow it to remain until the ether and alcohol are washed out, then place the wetted carbon tissue in the same manner as described for the plate with the gelatin coating, only in this case the use of the syrup may be omitted, all the after-operations being the same as described.

Aluminum Plates

In the case of aluminum, the sheet metal, which need not be thick, should be procured already frosted, and if a special size and shape of plate is required, perhaps with burnished edges, then it will be advisable to get the plate cut to shape, and have it frosted or matted by an electro-plater. In making portraits on aluminum, the metal must be cleaned in a warm solution of common soda to get rid of any grease spots, because the solution of potash lye, especially if very strong, is liable to attack the aluminum, this metal being acted upon vigorously by the caustic alkalies of potash and soda. All that will be necessary in the use of aluminum, after cleaning and rinsing, will be to dip it in the syrup and the printed carbon tissue as well, after soaking it in cold water until it lies flat, and squeegee them together as in the silvered plate, not attempting to develop until the two have remained together for twenty minutes or more. Development may then be proceeded with in the same manner as the silvered plates.

The collodion used in this process is not the enamel collodion—this is too thick—the collodion required is thinner; so that if enamel collodion is the only kind procurable it must be thinned with a mixture of equal parts of pure alcohol and sulphuric ether. A clear, hard varnish suitable for the coating of these carbon prints upon metal can be made as follows:

Clear celluloid . . .	25 grains
Concentrated amyl acetate	6 ounces

Cut the celluloid into strips, place the above into a clean dry bottle, stand this in water which must be brought to boiling point, a piece of folded paper between the bottom of the bottle and the pan to prevent the bottle from cracking. The mixture must be shaken well several times and the bottle allowed to remain in the hot water to cool down gradually. In the course of about six hours the celluloid will have become liquefied. The mixture must be shaken well to insure complete incorporation. This preparation will present the consistency of castor oil and may

have to be thinned down slightly, which is accomplished by the addition of an ounce or two of the concentrated amyl acetate; this preparation is known under the name of crystalline. The surface produced by this preparation is exceedingly tough and resistant; a photograph upon metal or glass when coated with this varnish becomes quite waterproof. It is applied by pouring upon the plate the same as described for collodion.

The drying may take place by spontaneous evaporation at ordinary temperature, or may be aided by heat. The first method is the best. Another waterproof varnish may be made by mixing the following, in this case no heating is required:

Concentrated amyl acetate	6 ounces
Pyroxylin (gun cotton) .	240 grains

Shake the mixture well, nearly the whole of the pyroxylin will become dissolved, filter through a piece of cheesecloth pressed lightly in the neck of a glass funnel; repeat this operation twice. The varnish is now ready for use.

In using these preparations, pour only a small pool of the liquid upon the plate, give it time to flow to each corner. This will prevent the overflow at the edges, the varnish being more viscous than ordinary colloidion; while if it is too thin the surface will show up in prismatic colors. In this case the plate must be varnished twice.

The Sulphide Toning of Bromide Prints

Processes of sulphide toning may be divided into two general systems, one being distinguished as direct, and the other as indirect. In the former the toning is effected by the simple immersion of the print in a solution in which it is left until the desired result is obtained. Hypo-alum toning is one such method, but this will be treated later in a special article, and for the present we shall only touch on one other direct method Indirect methods involve the use of two or more baths, one of which is usually a bleaching solution, and these methods being perhaps more used than any others are generally the ones meant when we speak of sulphide toning.

Whatever method is used, whether direct or indirect, we must of necessity start with a good bromide print as a foundation, and a print suited to sulphide toning must have certain qualities which are not necessarily essential in an ordinary black tone print to be preserved untoned. There is a considerable degree of latitude in bromide paper, and a good black print can be produced in several ways—that is to say, of two prints, each good in its way, one may have received a brief exposure and been developed up to its limit, while the other has been exposed for a longer time and development has been stopped before it went too far. As they are, either print may be quite satisfactory, but for sulphide toning only the first one is of use in producing really fine results Properly treated, it will give rich brown tones, while the other at the best will only give poor, feeble browns It is therefore essential to adjust the exposure, in the first instance, so that prolonged development up to the limit will yield a satisfactory print. As bromide paper develops rapidly, in any case three to four minutes may be looked upon as a long time, it is a safe general rule to adjust exposure so that full development may be reached in *not less than* three minutes. If it is necessary to snatch the print out of the developer in two minutes to save it, we can feel certain that the print will be of no use for sulphide toning, though it may make a very passable black print.

It must also be remembered that a print of the right quality can be produced only from a good clean negative free from fog. A negative of the kind that will either enlarge well or give a good carbon print is the type to aim at. Thus if sulphide toning is intended, we must keep the fact in view from the very beginning of our photographic operations if good results are to be secured.

The most usual and most general process of toning consists of first bleaching the print, and then following with a solution of sodium sulphide. Many bleachers are available, but the best and most convenient for general use is a solution containing potassium ferricyanide and either potassium or ammonium bromide. The following is a good formula:

Ammonium bromide . .	100 grs.
Potassium ferrocyanide .	300 grs.
Water	20 ozs.

The print is immersed in this, and when bleached is washed for a minute only. It is then covered with a solution of sulphide made as follows:

Stock Solution

Sodium sulphide (pure white crystals)	4 ozs.
Water	20 ozs.

Take three ounces of this stock solution and make up to 20 ounces for use.

A few seconds in the sulphide bath will give a full brown tone, and then the print is well washed and dried. The washing after fixing and before bleaching must be very thorough, and some workers claim that better tones are secured when the print has been hardened in chrome-alum, or when the chrome-alum acid fixing-bath has been used. It is advisable to harden in warm weather, but whether the hardening really affects the tone is somewhat doubtful.

Many variations of the method as described have been suggested from time to time, but only two or three are really worth consideration. The first of these is the use of a thiomolybdate toning bath in place of the plain sodium sulphide. This thiomolybdate toner is a patent preparation sold by Edmond & Co., and the resulting tone is a rich brown of a purplish tendency. Another special "tabloid" preparation is the thiostannate bath, sold by Burroughs, Wellcome & Co., which gives a good umber brown.

Sulphide Toning

PROBABLY the chief reason for the use of the sulphide or redevelopment process is that cold solutions are used and it is generally considered easier than the hypo-alum method. The chief trouble with it is that one can never be quite certain as to the tones that will be obtained, and all sorts of bleach have been suggested to obviate this. The real cause of the trouble lies in the exposure and development. If the exposure is prolonged, so that development has to be stopped early, then unsatisfactory yellowish tones are obtained; while if the exposure is so adjusted that development is not complete in less than two and a half minutes, rich tones can be obtained every time; further than that, it seems then as though it is perfectly immaterial what the actual developing agent is. A flat, thin, foggy print will never give a good tone. As a matter of fact the print should be developed so far that, as a black and white, it is hopelessly overdeveloped, and there should be no actual whites even in the high-lights. The sulphiding so lightens the tones that an underdeveloped print will look weak and washy. A print that is overdeveloped, with all its shadows blocked up, will when sulphided show details even in the deepest shadows, as the brown is so much more transparent and luminous than the black.

I have not found that there is one paper more suitable for this process than another; though those with buff supports look better. I have found that some papers are more prone to blister than others. The remedy for this is a chrome-alum fixing-bath.

All sorts of formulas have been given for the bleaching bath, and frequently it is recommended to bleach the bath right out. I do not believe in this. It is all right if you want bright yellowish colors; but some of the finest tones I have been able to secure are from prints that have been so superficially bleached that only the fine details in the highest lights have disappeared. One has then a main image in black silver and superimposed on that a superficial film of yellow silver sulphide, and the two give a particularly rich tone that cannot be obtained by any other method.

The usual bleach is a mixture of ammonium bromide and ferricyanide, but I think that much finer tones are obtained with the following:

Pottassium iodide . . .	5 gm.
Potassium ferricyanide .	15 gm.
Water	1000 c.c.

This bath is about half the usual strength, but it is made so on purpose. It ensures quite even action and it works so much slower that one can stop its action at any desired stage.

A very instructive experiment is to make half a dozen prints all alike from the same negative, immerse them in the bleach for various times, mark on the backs the time of bleaching, then cut the prints in half after washing and sulphide only one-half. One has thus a record of how a print should look to obtain any particularly striking tone and also a record of the duration of the bleaching.

One factor, which is often neglected, is the temperature of the bleach. It is a well-known fact that all chemical reactions take place much more rapidly the higher the temperature. If regularity of tones is required, then a constant temperature and a constant time of bleaching is essential. Some operators claim that drying the print before bleaching is an improvement, but this I cannot personally confirm.

What is most essential is a thorough washing after fixing so that every trace of hypo is removed from the print and image. If this is not done, one has formed in the print surface the well-known Farmer's reducer, and the print loses considerably in vigor with the consequent result of poor tones.

The redevelopment bath may be any soluble sulphide, but the sodium salt is the simplest. It is the cheapest chemical that we can use, but my advice is to purchase only the purest—that which is used as a chemical reagent; it costs twice as much, but it is 98 per cent. pure. It is bad stuff to keep, as it rapidly absorbs water from the air and spoils. The best thing to do is to dissolve it as soon as purchased in three times its bulk of water, and store in tightly corked bottles. For use, one part of the above may be diluted with five parts of water, the prints immersed one by one, and the batch left with an occasional turn over. The time of immersion in this bath seems perfectly immaterial; five seconds or fifteen minutes seems to make no difference to the tone, though too long will cause blisters in the subsequent washing with some makes of papers. Too long washing after the bleach will also cause these, and actually a wash of two minutes in running water is quite enough and better tones seem to be thus secured.

Some operators prefer liver of sulphur, rendered alkaline with ammonia; but this, which is a potassium salt, presents to advantage over the sodium salt.

The only process in which I have found the potassium salt useful is in the direct toning process, which may be said to be a variant of the hypo-alum bath. After fixing and washing the prints should be hardened in a 5 per cent. solution of chrome alum for five minutes, then washed for one minute, and immersed in the following:

Liver of sulphur . . .	6 gm.
Water	1000 c.c.
Ammonia, a few drops	

The temperature of the bath should be 105° F. A very rich brown is obtained in a very short time.

Enlarging

A GOOD enlargement will often procure an order, and I make it a practice to occasionally make one from a good portrait merely on speculation. If not sold it is hung on the reception-room wall.

The following is my method of enlarging, which possesses no particular novelty, but some visitors who have seen it have thought it worth while to copy. I use no lantern, yet all

my enlargements are made in the dark-room by artificial light.

I have cut in the wall of the dark-room an aperture that will take a 10 x 12 plate, and a local carpenter made a series of kits that will fit in this aperture snugly, one for every size plate down to 2½ x 3¼. Inside the dark-room is a wooden shelf, supported by stout iron brackets, which fold flat against the wall, and the shelf also drops down so that everything is out of the way till wanted. On this shelf is placed an old studio camera that has seen its best days and had been relegated to the lumber room. The lens is an old rapid rectilinear that did good service but has been supplanted for studio work by an anastigmat.

The source of light is a piece of tin bent to the arc of a circle and painted inside with dead-white enamel. This is the actual source of light as regards the negative, but actually the lights are two of the nitrogen-filled Mazdas, each 100 c.p. These are placed one on each side of the aperture and a piece of tin prevents any direct light from reaching the negative. If the tin is brought to the proper curve there is no necessity for using any diffusing medium, such as ground or opal glass. And the tin should also be brought round behind the lamps so that it acts as a reflector.

One great advantage of this arrangement is that there is no heat in the dark-room, and naturally there is no necessity to enclose the lamps. Naturally one could use one of the regular enlarging lanterns or even a stereopticon for illuminating the negative, but if the latter be used with an arc, a piece of ground glass must be placed between the arc and condensor to obtain equality of illumination.

Artificial light is far superior to daylight. It is more constant and it enables one to work at times, as in the evening, when daylight is not available. The exposures are never so long as to be a serious objection. I find that mine run about 60 to 90 seconds.

I use no easel for supporting the bromide paper, but an old 20 x 24 printing-frame, into the front of which is firmly puttied a sheet of plate glass. I first used a sheet of cardboard, marked with the various sizes of papers, but I found this a nuisance as it was difficult to keep the paper in its exact position when putting it into the frame; so I bought some sheets of black paper and cut them down to fit the frame, and in each sheet was cut an opening just large enough to take a given size of paper. These are laid on the glass, the sensitive paper slipped into place, and then a sheet of thick piano felt laid on top and the back put in. I have found this answers perfectly and never have the paper slip out of place. If, however, I want an unusual shaped print, and this sometimes happens, then I mask in front of the glass with strips of the black paper which are temporarily fastened to the frame with push pins.

Focussing is done on the sensitive paper itself, in all cases, and this is rendered possible by using a cap of yellow glass. This was also home-made, from an old lens-cap, and the glass is part of a fixed-out, well-washed dry plate that had not been exposed. The plate when dry was immersed in a 1 per cent. solution of tartrazine, a bright yellow dye, for half an hour and then rinsed and dried, and the front of the lens-cap was cut out and the rim glued to the glass, which was varnished with celluloid varnish to protect the dyed film. This gives a brilliant light that is perfectly safe and enables one to focus perfectly.

Let me add that a great deal of my outdoor work is now done with a 2½ x 3¼ pocket camera and then enlarged. So far as I am concerned, the day of the big camera has gone. This saves weight and cost of big plates. I use carriers and cut-up 8 x 10–Kodak portrait films.

Washing Plates and Prints

PROBABLY there are more different kinds of plate and print washers on the market than any other kind of apparatus; some are efficient and others are—well, let us say—less so. When one has an unlimited supply of water and does not have to pay for it, undoubtedly running water will do the trick, provided certain precautions are taken, in a reasonable time.

Naturally, when one has to deal with plates, a grooved tank is a great convenience, as it saves considerable space; although really placing plates in a large, flat dish, and tilting this up so that one end is a little higher than the other, and directing the water along the upper edge, will really wash plates quicker than the average trough. Some troughs have a connection to a water tap, so that the water issues a fine spray between the plates. Theoretically this should be the most efficient; but my experience of this type is that the plates become very rapidly covered with innumerable air-bubbles which cling most tenaciously to the gelatin, and really prevent the access of the water to the film. I soon abandoned this type of washer and just let the water run down the rubber tube to the bottom of the tank and the surplus out of the top.

Some years ago I was told that the only way to wash plates properly was to soak them five minutes, empty the tank, then soak again, and repeat the operation twelve times in an hour. The man who told me suggested that I pour an ounce or two of old, dirty, pyro developer into a tank and try both methods. I followed his advice and found that it took just four times as long to entirely remove all trace of color from the water by a continuous flow through the tank as it did when the water was changed every five minutes. This, then, is the practice that I have continued ever since. It is not much trouble and certainly the negatives are thoroughly washed. I do not use any siphon or tap in the tank. It is just tipped up bodily and the water emptied out as quickly as possible and filled up as quickly as possible.

Where there is plenty of room, and quantity of water used is no object, then a series of trays, one under the other, is very efficient. Any carpenter can make these; as a matter of fact, I made mine myself out of some old lumber, and they are, I may say, used only for small plates—nothing larger than 4 x 5. The top

board has an edge of one-fourth inch moulding on each side, and at every five and a half inches are driven into the bottom board two brass picture-tacks that are just long enough to project above a plate. I have five boards, one over the other, each two feet long and the boards are sloped in alternate directions, the actual drop being two inches in the two feet. The water runs over the top board and its four negatives onto the second board, which projects an inch beyond the first, so that all the water must run down the second board, and from this onto the third, and so on. The negatives placed on the top board I have found to be washed enough, with quite a slow stream of water in thirty minutes. They are then removed; those on the second shelf moved up to the top shelf, and those on the third moved up on to the second. As I have six such shelves, I find I can wash twenty-four 4 x 5 plates in about two hours.

Now there is one point which, as far as I can find out, very few photographers take any notice of, and it is whether the water they use is clean or dirty. My experience has been that there is no water that does not carry small particles of suspended matter or dirt, which settles on the gelatin film and is not removed by mere washing. It is as well, therefore, to use a tuft of absorbent cotton; pass this over the surface of the negative film while the latter is held under the tap, then squeeze the bulk of the water out of the cotton, and pass lightly two or three times over the film so as to remove the excess of water from the film. This enables one to dry the film much more rapidly.

When we come to the question of washing prints, we have a totally different set of conditions. Here we have a support which is porous, while in the case of a plate or film the support is not porous, and therefore in the former case the hypo can be removed from the back as well as the front of the print, but in the case of the plate or film it has only one surface to exude from. Naturally, one might say, that as the paper is porous it must absorb some hypo solution, and this must be admitted; but the gelatin film of a print is very much thinner than that of a plate, so that as the hypo can diffuse from the paper the print ought to be more quickly washed—and it is.

Many of us can recall the old days when albumenized paper was the only one that we had and we washed our prints for hours—in some studios even all night was not thought too long—but we are saner now. Yet there are probably few who know how little washing is actually required to free a print from hypo. Twenty years ago it was proved by Haddon and Grundy, two English chemists, that ten minutes' washing in running water would remove all the hypo from a gelatino-chloride print, and the paper they used had a much heavier coating of baryta gelatin than is ever used at the present day for the so-called development papers. Long washing of prints, therefore, is quite unnecessary.

The most striking of all experiments on the washing of prints were those of Lumiére and Seyewetz; so striking were they that few believed the facts, yet they have been confirmed. These chemists stated that if a pint of water was allowed for every square foot of print, the print soaked for five minutes, then drained and squeegeed, and the operation repeated eight times, the print would be thoroughly washed. They proved that if a 5 x 7 print is soaked in successive changes of water, the total consumption being about a quart, that it is more efficiently washed than if twenty gallons of running water were used.

Such a statement as this is almost incredible, but it is at least worthy of credence, and should show us that repeated soaking, draining, and squeegeeing is the most satisfactory and economical way of washing. One need not squeegee each print, a dozen or more can be piled one on top of the other, and a heavy roller squeegee passed over them two or three times. For some years I have adopted this method and found it eminently satisfactory.

An Iron Developer for Plates, Films and Paper

SINCE the introduction of hydroquinone, metol, eikonogen, amidol, and many other developing agents, nearly all being the derivatives of the coal-tar compounds, the once photographer's friend, ferrous oxalate, appears to have been quite forgotten.

There have been many variations of this valuable developer, none of which surpassed the plan of dissolving the true ferrous salt in a strong solution of potassium oxalate. More iron and developing power can be secured by this method than by any other, for the simple reason that the solution of potassium oxalate is not overloaded with other products of chemical decomposition. A solution of ferrous oxalate in potassium oxalate, possessing the greatest developing capacity, is to be made by making a hot solution of potassium oxalate, and dissolving therein as much ferrous oxalate as it will take up; in other words, this method produces a saturated solution, which may be made acid with various acids, or it may be modified so as to produce a different color by the introduction of either ammonium bromide or potassium bromide, or it may be used in a perfectly neutral state. This developer must not be used in an alkaline condition; should this be attempted, the exposed plate will become fogged, and a thin image will be the result.

The question now is, where can ferrous oxalate in its true state be obtained? Like many other salts that were, and still are, used in photography, they can only be obtained of the wholesale chemist. Oxalic acid, which is necessary for the production of ferrous oxalate, can be purchased at any drug store, while protosulphate of iron would have to be purchased in quantity of the wholesale chemist. At the present time, 1915, the price of oxalic acid has gone up considerably. In the wholesale line, the price increased from nine cents per pound to thirty cents; while all the salts of potassium have also gone up in price. The photographer, today, could not in his ordinary way of business make

oxalic acid, the process being too intricate. The base from which oxalic acid is made today is just common sawdust, the same kind that is used to sprinkle the floors of warehouses. Before this discovery was made, oxalic acid was produced from sugar; this, however, was too expensive. It is not the intention of the writer to go into the manufacture of oxalic acid. The method of making ferrous oxalate will be described, because the materials can be purchased readily anywhere in small quantities, which would enable the photographer, professional or amateur, to prepare ferrous oxalate with ease and at a small expense, and from this chemical, when made, to make a developer that will produce negatives upon plates and films and prints upon paper that will rival the more modern developers. It may be mentioned here that the action of this developer is not so vigorous as the various developers made with metol and hydroquinone, although it rivals the latter salt in speed action, and, like hydroquinone, development must be carried farther in its reducing action so as to allow for the drop in density when the image is fixed in a chrome-alum-hypo fixing-bath. Lantern slides may be developed with this particular developer readily, which will produce results like pyrogallic development, if a few drops of a 10 per cent. solution of bromide of potassium be added previous to commencing development. The high-lights of a transparency developed in this solution will present bare glass, and if the color is not quite to our liking it may be changed by any of the methods employed for the color changing of lantern slides.

How to prepare ferrous oxalate: In the first place, two stoneware jars or crocks will be required of one gallon and a half capacity each, either with or without lids; they must be well cleaned with hot water. Then procure 1 pound of oxalic acid and 2½ pounds of proto-sulphate of iron; dissolve the proto-sulphate of iron in one gallon of filtered cold water, preferably distilled water; now dissolve the oxalic acid in half a gallon of water, also cold. As soon as these salts are dissolved, which will be aided by considerable stirring (the mixing must not take place until the salts in each crock are dissolved), then pour the oxalic acid solution into the proto-sulphate of iron solution; stir the mixture well with a strip of glass or a stick of white pine; then in the course of half an hour stir the mixture again well. It will then present a very turbid or muddy appearance. The mixture must now be allowed to stand undisturbed for twelve hours. At the end of this period the clear liquor standing above the precipitate must be decanted carefully so as not to lose any of the precipitate, or it may be drawn off with a siphon and thrown away. Upon examination there will be found at the bottom of the crock a copious, pale-yellow precipitate, very much like a mixture of mustard and water, but very different in composition. This precipitate is *ferrous oxalate.* This precipitate must now be washed by pouring upon it two pints of filtered water. Stir the mixture well, allow it to settle (which will take about three hours), pour the clear liquor off again, add another quart of filtered water, continue the same process, when the clear, faintly yellow liquor must be again poured away, and the precipitate poured into a large filter-paper in a glass funnel with a piece of absorbent cotton, pulled out cobweb fashion, placed at the apex of the filter-paper. This precaution is necessary to strengthen the filter-paper at this part to prevent breaking. The crock must now be rinsed with cold water, the rinsing being poured into the funnel. As soon as the liquid has passed through the filter, the funnel may be filled to the brim with distilled water and allowed to filter until no more water passes through. The whole mass may then be lifted by the filter-paper and laid down upon other absorbent paper, in such a way that the filter-paper holding the precipitate may be opened and the contents exposed. In this way the whole mass may be placed in a warm place to dry, resting upon clean cardboard. The iron receptacle over an ordinary kitchen stove, where the pots and kettles are kept, or the plate heater, will be found to be just the thing. As drying proceeds, say at the end of a day, the whole mass will be stiff enough to handle. Then withdraw the wet blotter and cardboard and substitute another set. In the course of about twenty-four hours the precipitate will be perfectly dry, and the mass, although it may appear to be very lumpy, may be easily crushed because of its friability. The resulting yellow powder is the ferrous oxalate of commerce. Upon weighing the powder, it will be found that there is just about one pound and two ounces, or, should there have been some loss in the operations, a full pound of sixteen ounces will have been acquired in a thoroughly dry state. To make up a powerful developer with this chemical, prepare the following solution:

Hot water	60 fl. oz.
Neutral oxalate of potash	16 oz. av.
Bromide of ammonium	20 grains

Now add as much of the ferrous oxalate powder as the hot liquid will take up or dissolve, which will be about three ounces; stir the mixture with a glass rod and add three drams of acetic acid No. 8. The resulting liquid will assume a deep yellow color, bordering upon red. As soon as it is cold enough pour this liquid into a wide-mouth, amber-glass bottle close up to the cork; then, when it is quite cold, it will be fit for use to develop plates, films, or paper.

The description given may appear to indicate a tedious process; this will be found, however, not to be so. All the operations are quickly performed, to say nothing of the pleasure and correct knowledge obtained in producing the material. Occasionally the image may appear to be slow in starting up compared with metol and similar chemical substances; the result, however, will be perfect. When paper is developed, the shorter the time of exposure the blacker will be the resulting print, while if the time of exposure has been a little too much the print will assume a brown color. The writer has obtained with glossy papers, beautiful prints, both in black and brown.

The usual acid water is required between the

developing solution and the fixing-bath; this stops development and aids in preventing fog.

After the fixing of the image is complete and the prints have been washed, the whites may be made very brilliant by passing them through the following clearing solution:

Water	30 fl. oz.
Common alum	2 oz. av.
Citric acid	1 dram

If there is the faintest trace of discoloration in paper prints developed with the above developer, this clearing solution will remove it rapidly, the blacks becoming improved at the same time.

This developer may not be suited for *all* kinds of paper, owing to the variable components of the emulsions, but for bromide and chloride developing papers it has yielded prints of unsurpassed beauty. A separate solution should be kept for negative work, and another for paper prints. A 10 per cent. solution of bromide of potassium will be found useful for restraining purposes; it acts with more vigor than the bromide of ammonium. The latter salt answers every purpose with this developer, and for that reason it has been included in the makeup.

The ordinary acid hypo fixing solutions may be used, but they will reduce the image slightly, so that development must be carried a little farther to counterbalance this tendency. The developer may be used several times over, if returned to a bottle well-corked and filled nearly to the top. The ferrous oxalate in a dry state will keep without deterioration for any length of time, if kept away from the air in a well-corked or stoppered bottle, and be ready for use at any time for making new developer.

The Bromo-Iodide of Copper Intensifier

THE objections to the usual mercury-ammonia intensifier are many. The density of the finished result is uncertain, spots and pinholes may appear in great numbers, while the permanence of the intensified negative is a matter of doubt.

A blackish colored deposit is rarely so nonactinic as one of a reddish color, and for this reason I prefer to have negatives of a reddish or yellowish tinge rather than pure black and white, such as that usually obtained with mercury and ammonia or by direct development with developers other than pyro. Pyro when used with soda or ammonia, more particularly the latter, gives negatives of a good printing color; they are not "pretty," like those obtained with, say, hydroquinone or any of the newer developers, but they give better results, particularly on P. O. P.

Once upon a time I used the uranium intensifier, which not only intensified the image, but stained it to a good reddish-brown color; but the uranium intensifier at its very best is unreliable, and is apt to increase the coarseness of the grain in the plate.

The bromo-iodide of copper intensifier is better in every way than the uranium, although perhaps a little more expensive and troublesome to make up. But it may be used for bromide papers and lantern slides as well as for negatives. With all it has a toning action just as uranium, and is far more reliable.

There appears to be a belief among amateurs that intensification of any kind is a sort of cure-all for underexposure, but this is not so. The effect of intensification is to increase the contrast, or the light and shade—the very qualities that are usually prominent in underexposed plates. No after-treatment of the film of a developed negative can possibly replace the action of light, and produce details when the exposure given has been altogether inadequate. It is with overexposures, where the detail is full and the contrasts are weak, that intensification is of the greatest value.

With the bromo-iodide of copper intensifier, as with most of the others, it is absolutely necessary that the developed negative should be very thoroughly fixed and washed. A thorough washing is of little use unless the negative is thoroughly fixed, preferably in a newly-made hypo bath. An intensifier by itself rarely causes stains, the latter being always traceable either to imperfect fixing or to improper washing, probably in most cases to both.

In order to "make assurance doubly sure," as Shakespeare says, I often take the precaution to use two fixing-baths, and after what is supposed to be a good washing I immerse the negative in a saturated solution of alum, and wash again in running water for twenty minutes.

The bromo-iodide of copper solution may be made up in any quantity, taking the following formula as a foundation:

When dissolved the following iodide solution is added slowly and with constant stirring:

Potassium iodide	8 gr.
Potassium bromide	20 gr.
Water	1 oz.

If it is properly mixed, a slight deep-yellow-colored precipitate will form. It is then filtered or allowed to settle, as only the clear portion is required for use. The solution keeps well, and may be used over and over again until it refuses to work properly. It is, however, advisable to strengthen it now and then by adding about 5 grains of potassium iodide and 15 grains of potassium bromide dissolved in 1 ounce of water. The negative, if dry, should be soaked to soften the film; it is then placed in the copper-iodide mixture, as above, the operation taking place in the strongest light possible. The negative bleaches rapidly, and it should be allowed to remain until the film becomes a canary yellow color all the way through, and even in character. When viewed by transmitted light, the shadows should appear clear, and the stronger the daylight when the negative is bleached the clearer the shadows appear to be. The average time of bleaching is ten minutes.

The yellow negative is then removed from the bleaching solution and washed in water for a quarter of an hour, but no longer. It is then ready for darkening. As with a mercury bleached plate, the darkening may be accomplished in

many ways, the color of the darkened image depending on the state of the original image to some extent, but very much more upon the means employed for darkening.

A good darkener for blackish tones is a strong solution of sodium sulphite in which a few grains of silver nitrate have been dissolved, but the charm of the process is the various colored images which may be obtained by darkening the bleached image with old or new developers, redevelopment taking place in all cases, as did the bleaching, in the strongest light obtainable. All developers that I have tried, except eikonogen, I have found give good results. But, with one exception, the color of the image is a grayish black. The exception is hydroquinone, made up as follows:

Water	4 oz.
Sodium sulphite	½ oz.
Sodium carbonate	60 gr.
Potassium bromide	3 gr.
Hydroquinone	50 gr.

The color of the redevoloped negative is, as stated above, strongly affected by the composition of the developer, and it varies a little, but not much, with different plates. This formula gives a kind of claret-colored image as a rule, or a rose red, which is very non-actinic, and makes a good printing negative. By increasing the sodium sulphite and hydroquinone, darker shades of red and brown may be secured up to a good black.

A white porcelain dish should be used for the darkening process, or, if a black one is used, it is advisable to place a sheet of white paper under the negative, in order to reflect the light, because the stronger the light the better the result. The developer is allowed to act until the film is developed through and the image is of the required shade. It is then washed and dried in the usual way.

Negatives intensified in this manner keep better than those treated with mercury or uranium, and apparently undergo no greater deterioration by the action of the atmosphere and time than those which have not been intensified.

Bromide prints are intensified like negatives. In bleaching the print, however, the paper will perhaps assume a bluish tint, from the formation of iodide of starch; but this will disappear when the hydroquinone developer is poured on. The picture then develops to a sepia color, the exact color varying somewhat according to the strength of the image before intensification, the composition of the developer, and, to some extent, also upon the strength of daylight in which the operations of bleaching and redevelopment are carried out.

When using the process, more particularly with negatives and lantern slides, it is important to bear in mind that the picture to be treated must be quite free from fog.

Matt and Glazed Portraits by the Carbon Process

MAKING carbon portraits in 5 x 7 or 6 x 8 sizes by the usual double transfer process, employing a flexible support to develop the prints upon, always gives a dull or semi-matt appearance but not a complete matt surface, one that should give no semblance of gloss.

By a slight manipulation of the Lambertype process a matt surface can be obtained, and, as two methods are available, I shall describe them as used in my general practice, which may prove of service to other photographers. The whole process of carbon printing will not be gone into here, because it is assumed that the readers are acquainted with the process.

The formula for the sensitizing solution is given, owing to its having answered well for the purpose, therefore it can be depended upon for all the usual kind of work in demand for good ordinary negatives, and as the tissue when sensitized with it will dry, and be fit for use in less than four hours, oftentimes it will dry in less than two hours, which in cases of hurry-up orders gives an advantage.

Sensitizer

Warm water	50 oz.
Potassium bichromate (powdered)	3 oz.
Ammonium carbonate	1 dr.
When cold add alcohol	20 oz.

The sensitizer must now be filtered and kept in a covered stoneware jar or a wide-mouthed brown colored glass bottle, when it will be ready at any time for sensitizing the tissue.

Preparing the Plates for Matt Development

The best kind of plate to form the matt surface is the fine emery-ground glass, such as is used for focussing screens of the camera, or emery-ground opal glass plates. Although the latter are more expensive than the former, an advantage is gained by the use of these in enabling the exact quality of the portrait to be easily seen before the final transfer. When using the camera screen plate some practice is required to decide at a glance, by reflection from a dead-white surface, the correct depth for a finished print. This is not a difficult matter; it is simply acquired by practice.

The plates, which may be 5 x 7, are washed in warm water, to which a piece of carbonate of ammonia has been added. About the size of a walnut, in half a gallon of water, has been found to answer the purpose. This will remove any greasy finger-marks or adhering dirt without injury to the hands. The plate, while still wet, must be rinsed in a stream of water and placed in an ordinary negative rack until dry.

Stripping Medium

Pure white wax	15 gr.
Ether (sulphuric)	5 oz.
Pure benzole	½ oz.

A small quantity of this must be rubbed over the ground surface of the plate and polished off with light rubbing. Treat all the plates required for the work with this stripping medium and coat them with the following collodion, and as

each one is coated place it into a grooved washing tank of cold water.

Film Collodion

Alcohol (pure)	5 oz.
Soluble cotton	50 gr.
Ether (sulphuric)	5 oz.

This collodion must be filtered, to separate any cotton fiber, or, if time permits, let it stand undisturbed for a week, and pour off the clear portion for use.

The tissue of any appropriate color, having been exposed, may now be steeped in cold water until it lies flat. One of the prepared plates is now slipped beneath the tissue, the two are lifted together, and brought into complete contact by the use of the squeegee.

In the course of half an hour development in hot water may be proceeded with. As soon as the development is completed the plate must be washed in a stream of cold water, treated with the usual 5 per cent. alum bath, washed again and dried. The remainder of the process being the same as for double transfer, the prepared paper for the final support being softened in hot water, the dried plate having been allowed to soak in cold water for half an hour, the two are squeegeed together and allowed to become quite dry. The print is now separated from the glass plate by the insertion of the top of a penknife at one corner, and lifted off, when it will be found to possess the exact matt surface of the plate.

If glazed prints are wanted, all that one has to do is to use polished plate instead of the ground variety, all the other operations being the same, when a print possessing a very fine transparent gloss will result.

The employment of grained zinc plates has been advocated by some workers. The use of these is not advised, for should they at any time become scratched in the routine of general work they are then irreparably ruined and cannot be utilized again: while glass, either the kind used for focussing screens or finely ground opal, possesses no such objection. The only objection that can be urged against the use of glass as a temporary support is its liability to breakage. With careful handling this forms a very remote objection and should it occur in many instances a 4 x 5 plate can be cut from a 5 x 7 and still be brought into use.

If a print made as described should prove to be a little too weak, it can be easily intensified and utilized by using this intensifier.

Intensifier for Carbon Prints

Potassium permanganate	100 gr.
Water	5 oz.

Immerse the plate and watch the depth of color. As soon as this is reached, remove the plate, wash it well, dry, and follow with the transfer paper in the same manner as for the others.

The collodion film described will form a good protective coating to the print, either for the matt or glossy surface.

The following process which is the second way of securing a matt surface, can also be employed successfully, only in this case the use of rosin and beeswax is necessary, the plate being rubbed over with talcum powder in the first operation and finished with the wax solution described.

Resinized Solution

Yellow rosin	50 gr.
Pure beeswax (use no imitation)	50 gr.
Benzole	5 oz.
Spirit of turpentine	5 oz.

This will take about a day to completely dissolve, when it may be used upon a soft piece of rag, using only a few drops, rubbed well over the talcumed surface, and polished with another soft rag, by light rubbing.

The exposed and well wetted tissue is applied directly upon the plate, squeezed down, allowed to stand for half an hour as in the last method, and developed in the same way, finishing the operation with the double-transfer paper and drying in the same manner. As soon as dry the print may be removed, as with the collodion base, a matt surface being the result. Any spotting that is to be done, must be made with an albumen color, such as can be purchased in tubes, or a little white of an egg may be used when applying the color, which is preferably made by rubbing a solid cake color with a drop of water and albumen upon a piece of ground opal glass, watching the tint upon the side of the opal.

Stripping Films from Glass Negatives

THE difficulties usually encountered in stripping a film from its support, and transferring it to a new plate of glass, are:

1. The separation of the film from its support without breaking or tearing.
2. Prevention of enlarging and distortion.
3. Manipulating the film while off the glass.
4. Laying it down on a new support without air-bubbles or wrinkles.
5. Securing its adhesion to the new glass.

In my own work it has been found to be a comparatively simple matter to overcome all these difficulties, though the operation is one requiring great care and delicacy in manipulation, especially when treating large negatives. Care is particularly required to avoid breaking or tearing a film which is being removed from a cracked or broken negative, but it is not a really difficult task. Frequently wood alcohol has been recommended by photographic writers for reducing a film to its original dimensions when it has expanded during stripping. In my experience, this is in every respect undesirable. Although a film may be reduced to its original size by the use of spirit, the enlarging and subsequent reduction are invariably accompanied by distortion. The film contracts unevenly, and the consequent alteration of form is absolutely prohibitive in many subjects, and undesirable in all.

Before commencing the operation of stripping, the film must be very thoroughly hardened, and

the successful accomplishment of the work will depend very largely on the thoroughness of the hardening process. The solution should consist of two parts of commercial formalin to three parts of water; the negative should be immersed for about five minutes, and then washed in several changes of water for fifteen or twenty minutes, and then dried.

This formalin solution is very strong, but it possesses the power of rendering the gelatin film very hard. In using a weaker solution, there is a serious risk of slight enlargement and distortion of the film during the operation of transferring to the new support. By adopting the strength given, it will be found practicable to handle the film with reasonable freedom, and transfer it to the new support without injury or distortion.

The negative must be thoroughly dried before the operation of stripping is commenced. When dry, the film should be cut right through to the glass, about an eighth of an inch from the edge in the case of a large negative, or a sixteenth part of an inch for a small plate. A very sharp knife and a straight-edge must be used. All four edges of the negative must be cut in the same manner. The object of this cutting is two-fold: The first is the securing of a clean, sharp edge to the film when lifting from the glass, so as to obtain immunity from breaking or tearing. The edges of a negative plate hold the film very tenaciously, and there is great difficulty in lifting the film successfully from the original edges; the risk of breaking or tearing is very great. The risk is increased by the fact that the edges of the film are frequently comparatively ragged. By means of the clean, straight edge given by cutting through the film, the risk of tearing is practically removed. The second object of the cutting is to ensure that the film is slightly smaller than the glass to which it is to be transferred, as this greatly facilitates laying it down successfully.

At any time after cutting, the film is ready for stripping and transferring. The dry negative is immersed in a strong solution of washing soda. The solution is prepared by dissolving one ounce of washing soda in five ounces of water. Hot water should be used for preparing the solution, but it must not be used until quite cold. Sufficient solution must be used to cover the plate well, and care must be taken that no air-bubbles are allowed to remain on the surface of the film. The plate must remain in this solution for fifteen minutes, or a little longer. It should then be lifted out, and placed in a second dish containing a solution of hydrochloric acid, half an ounce of the acid to ten ounces of water. It must be taken direct from the soda solution to the acid bath without any intermediate washing. As soon as the plate is placed in the acid bath, innumerable air-bubbles will be seen to form between the film and the glass; it should not be touched while these air-bells continue to form.

After about five minutes, the operation of stripping may be commenced. First, the narrow edging outside the cut should be carefully lifted from the glass, removed from the solution, and thrown away. If any small pieces are allowed to remain in the solution, they may become a source of trouble by clinging to the film during transferring. As soon as these edges are entirely removed, the film itself may be slowly and carefully lifted from the glass. The best method is to apply the tips of the fingers to one end of the film, and roll it slowly off the glass. When about a quarter of an inch has been rolled back on to the film, the fingers should be moved back on to the glass from which the film has been removed, and the rolling movement continued, keeping the fingers in contact with the glass and the turned-up portion of the film. The fingers are always resting on the glass, and pressing against a roll of film that is being pushed along on the glass plate as it loosens its hold. The film will not curl into a roll by this method of working, but will simply fold back onto itself. The whole of this operation must be carried out while the plate is well covered by the acid solution.

The rolling back of the film must be continued until about half of the film is loosened, and turned back onto the other half. The loose portion should be then replaced in its original position, and the work recommenced from the opposite end, and continued until the film is entirely loosened from its support. The second half must then be returned to its original position, and the film will be lying flat on the glass, but quite free.

A piece of thin paper, slightly smaller in each direction than the film, must be put in the acid solution over the film, and allowed to soak for a few seconds, until it becomes quite limp. While this is soaking, the new glass support must be prepared for receiving the film. A solution of gelatin should have been previously prepared by dissolving a quarter of an ounce of gelatin in five or six ounces of water. The gelatin must be first soaked in cold water for about an hour, and then dissolved by draining off the cold water, and adding the requisite quantity of very hot water. Immediately before using, one grain of chrome alum dissolved in two ounces of hot water should be added to the gelatin solution, a little at a time, with constant stirring. This will make the total bulk of solution about seven or eight ounces.

The paper lying on the film should be carefully pressed into contact, care being taken to avoid wrinkles or folds, both in the film and in the paper. The glass plate should then be flooded with the hot gelatin, the paper and film lifted together from the acid bath, and adjusted in position on the gelatinized glass, and lightly but firmly squeegeed into contact. The strokes of the squeegee must be as even as possible, and always made from the center of the film toward the edges and corners.

The plate bearing the film and paper should be put aside for about ten minutes and then the paper may be carefully peeled off without any risk of disturbing the film. If the squeegeeing has been sufficiently careful, there should be no air-bells between the film and the glass. The film should lie perfectly flat and even, and in good contact throughout. It should then be put away to dry.

It will be noticed that the film is taken direct from the acid solution, and transferred to the

new support without washing. It is imperative that the film should not be put in water, or expansion and distortion are inevitable. By following the method given, the film may be attached to its new support perfectly and without the slightest distortion or injury.

After drying, the film may be washed, to free it from the acid, but this operation must be performed very rapidly. It must not be prolonged more than eight to ten minutes, but by using seven or eight changes of water, the acid may be removed sufficiently for all practical purposes. After drying, the film should be varnished in the usual manner.

This method is thoroughly practical and reliable. It requires neither special skill nor the handling of dangerous chemicals or substances difficult to obtain. For hardening the gelatin solution, if chrome alum is not available, five grains of ordinary alum may be substituted.

As described, the procedure is that to be followed for transferring a film from a cracked or broken glass to a new support. It is self-evident that, by a very slight modification, it forms a very simple means of reversing negatives for carbon printing by single transfer when reversal of the subject is not permissible. The modification must be made when the film is lying in the acid solution. In the case of a small film, it may be turned completely over in the acid solution when stripped from the glass before the paper is applied. Then, by applying the paper and transferring to the new glass, as already described, it will form a reversed negative. In the case of a large plate, 8½ by 6½, or larger, the following method may be adopted if the former is found too difficult. Press the paper into contact with the film while it is lying in the solution, without attempting to turn it over. Then lift the paper, with the film clinging to it, and turn it over in the dish, the film being now uppermost. Then apply a second piece of paper to the film in the same manner as the first, and separate the top paper and the film carefully from the paper first attached to the film. Then the hot gelatin should be applied to the glass plate, and the transferring continued, as usual. The latter is the plan that I have always adopted for sizes above half plate.

Waterproofing Dishes of Wood

I NEEDED a few large size dishes for enlargements some time ago, and, being located in the country, decided that it would be better to attempt making my own.

I had seen various methods of making dishes, using wood, cardboard, white lead, paraffin, etc., but the making of these evidently needed more manual dexterity than I possessed, for none of mine were waterproof.

Some of those made of cardboard and very light wood bulge horribly when one uses a generous amount of developer, etc., in them.

However, I have made a really satisfactory dish at last, and the secret of its success lies in the waterproofing solution.

The methods I used were: First procure the lids of two butter boxes—the sizes vary slightly in the different factories, but choose pieces without splits.

These will serve for the bottoms of two dishes; in my case they measured 13½ x 12 in.

For each of these you will need the following pieces, which can easily be sawn from parts of the butter box; the wood is half-an-inch in thickness. Two pieces 13½ x 2 x ½ in., two pieces 11 x 2 x ½ in.

Securely nail the two longer pieces onto the piece which is to form the bottom; next fit the shorter pieces in position, and nail securely both at the ends and to the bottom. The nails from the old box are most suitable, and no difficulty should be experienced in driving, as the wood does not show any tendency to split. Put the dish aside in a warm place, and allow the wood to dry.

Now prepare the waterproofing solution as follows:

Procure a large, old, iron saucepan, and melt 3 pounds resin in it over a small fire. Watch and stir this carefully, or it may boil over or catch fire. When the resin is thoroughly melted, stir in 8 ounces powdered plaster of Paris, and when this is incorporated add the same amount of red ochre.

Stir well, and, when thoroughly mixed, add about 8 ounces linseed oil. Boil and stir the mixture till the tendency to boil over ceases; it is then ready to apply.

It is a good plan to keep the mixture on the fire, and to coat the dish over the saucepan and subject to as much heat as convenient. Use a good, wide brush, and paint the inside, taking care to work the mixture quickly and thoroughly into the crevices. When this is completed, paint the joints on the outside—it is quite unnecessary to paint the whole of the outside.

Leave for about fifteen minutes, and test to see if it holds water If not, apply more of the mixture where necessary. Pour out the water as soon as possible, and leave the dish a day or two to harden thoroughly.

The quantity given is sufficient for about five dishes, and is, of course, applicable to the smaller sizes.

For instance, a cigar box of suitable size, from which the alleged decorative paper is removed, when coated, makes quite a good developing dish.

These dishes will withstand practically all the chemicals a photographer is likely to use, and are very serviceable.—*The Australasian Photo-Review.*

How to Mix a Developer

No doubt most photographers would think it quite unnecessary for them to be told how to mix a developer, but there are really very few who know the right way to go to work.

In the first place, ordinary tap water should never be used; it nearly always contains lime and other salts, which are precipitated by the chemicals and they are apt to cling to the surface of the plate and may give rise to spots or markings, quite small it is true, but still there. A great deal of the lime and magnesia salts are held in solution by the air and carbonic acid,

always present in tap water. Some people are, of course, more fortunate than others; my water is so full of air that negatives and films are completely covered with a layer of small air-bubbles when washing. It is advisable always to boil well the water used for the stock solutions, unless one uses distilled water. It should be boiled for at least ten minutes and allowed to cool down to about 100° F. and then filtered. A stock of this boiled water can be kept on hand in one of the stoneware water crocks with a wooden tap at the bottom and can be used for diluting the developer as well as mixing it.

In order to explain how to mix a developer we must take some simple formula, such as the *British Journal* formula for pyro, which is the best I have met with. It gives negatives practically free from stain and keeps well. It is:

	A	
Neutral sulphite solution	700 c.c.	10 fl. oz.
Pyro	18 gm.	126 gr.
Water to	1000 c.c.	16 fl. oz.

	B	
Sodium carbonate	100 gm.	700 gr.
Water	1000 c.c.	16 fl. oz.

For use mix 1 part of A, 1 part of B, and 2 parts of water.

The neutral sulphite solution is made as follows:

Sodium sulphite	70 gm.	1 oz.
Potassium meta-bisulphite	17.5	¼ oz.
Water	700 c.c.	10 oz.

Dissolve and boil for five minutes.

Everyone has some little peculiarities, and the following is one of mine: Nearly all my solutions are kept in two-quart jam bottles with wide mouths, rubber rings, and a metal spring that holds the lids down tight. These cost but a few cents; as a matter of fact, a nearby soda fountain will give me all I want for nothing, as they are glad to get rid of them. Every bottle, no matter what its size, has a definite quantity of water poured into it and the level marked with a diamond and the quantity of water also marked. This saves no end of time, as one has merely to pick up a bottle and read off at once what it will hold. Further than that, any bottle can be used as a graduate.

To mix the above developer a bottle is found and the dry salts put into it and then filled up with water to the 1400 c.c. mark. It being necessary to boil the solution, an iron kettle is found that will hold plenty of water; a couple of old plate-box lids are placed on the bottom, the bottle put in, and then cold water run in till it reaches nearly to the top, care being taken by lifting the bottle once or twice that the box lids are well saturated with water. Then the gas is turned on and the water allowed to heat gently, and at the same time the contents of the bottle heat up. If the outer water is hot, and the cold bottle is put into it, one stands a very good chance of cracking the bottle and losing the solution. The box lids or a pad of thick paper are all-important, as they prevent the direct heat of the gas from striking the bottle and thus prevent it cracking. When the solution has boiled, allow to cool down to about 100° F. (a dark-room without a good thermometer is only half equipped), then filter and add the pyro and make the total bulk up to 2000 c.c. *Do not filter after adding the pyro*, as you simply expose it to the action of the air and it becomes partly oxidized and the negatives are stained.

Exactly the same method should be applied to the making of all developers. One should bear in mind that the trick to obtain clean, white stock solutions that will keep is to dissolve the preservative first, that is the sulphite, then filter, and then add the developing agent. In all cases the quantity of the latter is so small relatively that the best way is to make the sulphite solution up to the full quantity and then add the developing agent, cork and shake well.

The only exception to this procedure is in the case of metol, elon, and rhodol; this must be dissolved first and completely dissolved before the sulphite is added. This is important and as much water as possible should be used, otherwise the metol is thrown out of solution and it is not easy to dissolve it again. If one has to make up a metol-hydroquinone developer, and but little water be used, a very insoluble precipitate, metoquinone in fact, is thrown down, and then nothing but actually boiling the solution will form a clear solution.

When one has to deal with a one-solution developer, in which the alkali and the reducing agent are combined, the latter and the preservative should be dissolved in about half the water, the graduate well washed, and then the alkali dissolved in the remainder of the water and added to the other and immediately corked up. Traces of the developing agent in the graduate immediately oxidize in the presence of an alkali and a white solution cannot be obtained.

I have seen many an assistant try to dissolve sulphite or carbonate or both by adding them to water and then stirring. This is wrong. In nine cases out of ten both will settle into a solid lump at the bottom, which is extremely difficult to get into solution. The proper way is to stir the water well with a rapid circular motion and sift the dry salts in slowly, very slowly. Then every particle of salt becomes surrounded with water and cannot form a cake. In all cases the temperature of the water should be at least 85° F.

There are two ways of making the alkaline solution for two-solution developers: The one is to use ordinary tap water, dissolve your salts and boil and cool and then filter. This removes most of the lime and magnesia salts; but it leaves your solution loaded with chlorides, which are restrainers. The correct way is to use distilled water or, as has already been pointed out, boiled water. Undoubtedly distilled water is the best and there are many cheap and economcially-working gas stills on the market that it will almost pay to install.

As to the keeping of stock solutions of developers, many plans have been suggested, such

as aspirator bottles, covering the surface of the solutions with films of oil, which is about the nastiest and dirtiest plan that I have ever tried. No one can say which is the best method, for the simple reason that no one but the user knows exactly how long a pint or gallon of developer will last, and the plan for one dark-room will be absurd for another. Personally, I always make up my solutions in 2000 c.c. lots, and they last me about three days, so that I never have to bother with the question. If I had to, I should make up the same quantities in bulk and then bottle off into smaller bottles, say of 500 c.c. capacity, so that constant opening of the bottles would not introduce so much air, which is the cause of stock solutions turning dark.

A photographer using a gallon of developer a week can afford to make up only that quantity, and can always spare the short time required to make up a fresh batch, after hours, at the end of the week, for with a little system and the right way of working it becomes a most simple matter to always have on tap the right developer made right.

A Method For Determining the Photographic Absorption of Lenses[1] (Abstract)

THE axial photographic transmission coefficient of a lens system for a given set of conditions will here be defined as the ratio of the light flux of photographic quality in the image of a small object on the axis of the system to the light flux of photographic quality that would reach the image were there no losses of any kind in transmission through the system, other conditions remaining the same.

The method employed in determining this coefficient involves the photographing of the lens image of a controlled circular source of approximate daylight quality and radiating according to the Lambert cosine law. Immediately after the completion of the lens exposure strips of the plate on both sides and adjacent to the lens image are impressed in a series of steps by direct action of the same controlled source in such a manner that the exposure in each step is continuous from beginning to end. From the developed plate the ratio of the times of exposure for equal densities in strips and image may be found. This ratio, together with the dimensions of the apparatus and the lens, gives sufficient data for the determination of the transmission coefficient of the lens for light of photographic quality. If dependable results are to be obtained care must be exercised in screening the plate from the action of stray light, from nearby objects during the sensitometer exposure and from barrel reflections during the lens exposure. These later may easily be eliminated by using a stop considerably less than the maximum, thereby eliminating the reflected light from cell rings and lens edges.

[1] Communication No. 87 from the Research Laboratory of the Eastman Kodak Company. Read at the St. Louis Meeting of the American Physical Society, December, 1919, and pubiished in *J. Opt. Soc.*, May, 1920, p. 83.

The entire light flux directed toward the entrance pupil of a lens system from a small element of source dS_0 on, and perpendicular to the axis of the system and radiating according to the Lambert cosine law is

$$L = \pi I_o dS_o \sin^2 U$$

in which I_o is a constant characteristic of the source and U is the angle subtended at the source by the radius of the entrance pupil. Were there no losses this flux would ultimately be uniformly distributed in the image whose size is controlled by the magnification. The flux density in the image (angle of incidence on plate disregarded) would therefore be

$$I_i = \frac{\pi I_o \sin^2 U}{Y^2}$$

in which Y is the lateral magnification assumed positive for real images.

Now if a photographic plate be directly exposed to the action of radiation from a plane circular source parallel to the plate and radiating according to the Lambert cosine law the flux density at the plate will be

$$I_s = \frac{\pi I_o R^2}{R^2 + l^2}$$

in which I_o is the constant characteristic of the source and R its radius, and l is the perpendicular distance from the source to the plate.

From these fundamental equations the expression for the transmission coefficient may easily be found to be

$$T = \frac{ts}{ti} \cdot \frac{R^2 Y^2}{(R^2+l^2)\sin^2 U} = \frac{ts}{ti} \cdot \frac{R^2}{R^2+l^2}\left[Y^2 + \frac{[Y(f+d)+f]^2}{h^2}\right]$$

in which ts–ti is the ratio of exposure times for equal densities in strips and image, d is the distance from the first principal point of the lens system to the entrance pupil considered positive when the entrance pupil is farther away from the source than is the first principal point, and h is the radius of the pupil. The equivalent focal length of the system is represented by f and the other symbols have the meanings already stated. When the object distance is large Y is small and may become negligible in comparison with f, in which case the equation reduces to the following simple form.

$$T = \frac{ts}{ti} \cdot \frac{4R^2 S^2}{R^2+l^2}$$

in which S is the F-number of the lens.

Because of inherent irregularities in the photographic plate, quite a number of exposures must be made in order to arrive at a good average value of the transmission coefficient. The preliminary results obtained have been found to be in good general agreement with those found by visual methods[1] as well as with values deduced from the theory of reflection and absorption. —G. W. MOFFITT.

[1] P. G. Nutting, *Astrophys. Jour.*, 40, pp. 33–42, 1914; R. W. Cheshire, *Pros. Opt. Con.*, pp. 34–40, 1912.

The Importance of the Nodal Points in Lens Testing [1]

THIS paper deals with the interpretation of the lens bench measurements when no collimator is used and when the object distance is limited.

In such cases the lens does not pivot on the second nodal point when lateral shift of the image is eliminated for small rotations of the nodal slide, but on a point which divides the separation of the nodal points into parts proportional to the magnification.

The complete formula for calculating the true focal length is derived, and the conditions under which the ordinary approximate reduction is sufficiently accurate are discussed. An important conclusion is that the true equivalent focal length of any lens cannot be determined with certainty unless the apparent separation of the nodal points for the object distance actually used be determined.

For the correct reduction of field readings under the conditions of the test, additional formulæ are derived. Strictly speaking, one cannot deduce from such a set of readings what the field aberrations would be for a plane object at any distance from the lens. With respect to photographic distortion, there is no reduction that rigidly satisfies the problem in general, but an approximation sufficiently good for all practical purposes is obtainable in nearly all cases.

These refinements need not be taken into account in many cases, but it is always necessary to determine actually whether or not they may be ignored.—G. W. MOFFITT.

A Tilting Tripod Top

THE advantages of the tilting top for the tripod are so well known that it is unnecessary to recapitulate them here; suffice it to say that in natural history work, in photographing ultra tall buildings, and in copying, it is well-nigh indispensable.

Recognizing these facts, various manufacturers have placed efficient devices of the kind upon the market. But sometimes the photographer forgets to purchase a thing of this kind until he happens to need it—and then, as there is no time to secure it from the distant supply house, he has to get along with a makeshift.

The top illustrated is such a makeshift, in that it may be knocked together in ten minutes; on the other hand, if you do not insist upon nickel and mahogany trimmings adorning all of your equipment, you will find it as satisfactory as more expensive apparatus.

The main part of the top consists of two pieces of board, each one inch thick and a little larger than the round top already on your tripod, hinged together at one end; the illustration shows these hinges as being upon the surface, but in order that the boards may fold tightly together they should be let into the wood a trifle.

The next step is to secure a short bolt and nut having the same thread as the tripod screw; this should be within the province of any hardware store. The hinged halves should then be folded together and a hole just large enough to admit this bolt be bored through their centers; then, if the bolt is fixed into the hole in the upper board so that the threaded end projects up through, it will serve as the new tripod screws for attaching the camera. The nut, on the other hand, is fixed in the hole in the lower board, and, when engaged by the screw in the main tripod, holds the new top firmly in place.

To complete the tilting device it is only necessary to arrange some means of holding its parts at the angle desired. This may be done in a number of ways; the one illustrated consists of a slotted strip of brass with notches filed in the edge of the slot—the strip moves about the pin driven into the edge of the lower board as a center. To engage the notches, two or more pins may be driven into the edge of the upper board; the strip may be slipped from one pin to another when necessary by simply springing it outward.

Of course, if you are intending this top for temporary use only, the slotted brace may be omitted and the parts held in place by means of cords. For a permanent addition to your outfit, however, you will need the brace; it will also be an advantage to sandpaper the blocks smooth and give them several coats of good varnish—this will both add to their appearance and prevent them from warping.

Whether permanent or temporary, you will find the tilting top a handy thing to have about, and well worth either the price asked by the dealer or the slight labor by means of which it may be made.

Roll-film Development

THE advantages of "tank" development of roll-films are too obvious to comment upon, and we will therefore confine our remarks to the chemical side of development.

We must confess to a wholesome respect for the pyro-soda developer. It gives that "bite" or resistance to the negatives, thus making it an easy matter to get good prints from them. By reducing or increasing the amount of sodium sulphite, the color of the deposit can be altered—less sulphite giving the characteristic pyro deposit. For tank work it is not advisable to considerably reduce the sulphite owing to the rapid oxidation of the pyro that takes place. There are several formulæ to choose from, but we give below one that has proved satisfactory to us in our own work:

PYRO-SODA "TANK" DEVELOPER

No. 1

Pyrogallic acid	1 oz.
Sodium sulphite (cryst)	2 oz.
Citric acid	40 gr.
Water to	10 oz.

No. 2

Sodium sulphite (cryst)	8 oz.
Sodium carbonate (cryst)	8 oz.
Water to	80 oz.

[1] Communication No. 89 from the Research Laboratory of the Eastman Kodak Company, published in *J. Gpt. Soc. Amer.*, 1920.

To make a working developer that will fully develop a film in 25 minutes at 60° F. take:

No. 1	½ oz.
No. 2	4 oz.
Water to	40 oz.

Adding 20 drops of a 10 per cent. solution of potass (bromide).

The temperature of the working developer must be correctly ascertained, as it has an important bearing upon the time of development. For instance, if at 60° F. a film takes 25 minutes to develop, it would only take about 16 minutes at 70° F. The addition of metol is often recommended, but we do not find any increase in the shadow detail by its use.

An extremely useful developer (for dish use) is metol-hydroquinone in which the alkali is caustic soda. This developer gives the greatest contrast and density it is possible to obtain. It is also very rapid and searching in action.

M. Q. Developer For Films

No. 1

Metol (or Monomet)	90 gr.
Sodium sulphite (cryst)	8 oz.
Hydroquinone	1 oz.
Potass (bromide)	120 gr.
Water to	80 oz.

No. 2

Caustic soda (sticks)	2 oz.
Water	80 oz.

For use take equal parts of Nos. 1 and 2, mix, and add an equal bulk of water.—*Rajar Trade Notes.*

Developers for the Autochrome Plate

While pyrogallic acid has been almost abandoned as the developer by workers of the Autochrome process, a number of other developing formulæ have come into use, and have been more or less commonly employed. It should be said at the outset that these are simply variations of those recommended by MM. Lumière.

The developer metoquinone was recommended by MM. Lumière on its introduction, and the first formula published by them was as follows:

Water	1,000 c.c.
Metoquinone	4 gm.
Soda sulphite (anhydrous)	18 gm.
Ammonia, .923	6 c.c.
Potass bromide	1 gm.

A short time afterward this formula was replaced by one of considerably greater concentration, which has not been subsequently modified.

Water	1,000 c.c.
Metoquinone	15 gm.
Soda sulphite (anhydrous)	100 gm.
Ammonia, .923	32 c.c.
Potass bromide	6 gm.

In making up this formula the metoquinone should be dissolved in warm water of the temperature of from 90° to 105° F. Cold water dissolves the developer very slowly; boiling water is apt to throw it down as a precipitate. The soda sulphite and bromide should be added after the metoquinone has been dissolved. On no account should any other chemical be added until the metoquinone has completely dissolved. The ammonia should not be added until the bath has been allowed to become quite cold.

In filtering the developer a large filter-paper and funnel should be used so that filtration takes place quickly. The funnel should be covered with a sheet of glass in order to prevent evaporation of ammonia. Although the bath keeps well in this concentrated form it is not a bad plan to store it in small bottles holding three or four ounces. These should preferably be closed with rubber stoppers.

A further formula which MM. Lumière introduced is one made up as above with the difference that the metoquinone is replaced by the same weight of chloranol, another developer of theirs. Chloranol has the advantage that it is about twice as soluble as metoquinone, so that the stock solution is much more readily prepared. Apart from this feature, chloranol has certain qualities which are an advantage in Autochrome work. One of these is that the silver image which it gives is of a somewhat brownish or warm black color, and thus tends to counteract a tendency to bluish tint in the Autochrome. It gives a somewhat greater degree of contrast, and, when it is used, intensification is less frequently necessary in order to obtain the required vigor in the transparency. The image comes up a little more slowly with this developer, and is also less rapid in reaching a sufficient degree of depth. It is therefore necessary to develop for a somewhat longer time with the advantage that the process is under better control. For these various reasons chloranol is a better developer than metoquinone except in cases of underexposure, when metoquinone is distinctly superior.

Another variation of the above formula consists in replacing the 15 gm. of metoquinone by

Methylparamidophenol	10 gm.
Hydroquinone	5 gm.

This developer gives practically the same results as that made up with metoquinone, although it is somewhat less energetic in its action. The plates are of soft gradation, very suitable for stereoscopic transparencies. In the case of subjects containing great contrasts of light and shade, such as those taken "against the light," it is easier to obtain harmonious results than when using metoquinone.

To those who seek to obtain Autochromes of the utmost brilliance and transparency for projection the following modification of the original metoquinone formula may be strongly recommended. The 15 gm. of metoquinone are replaced by:

Methylparamidophenol	7 gm.
Hydroquinone	8 gm.

This formula is also very suitable for plates which have been hypersensitized. The methylparamidophenol in these formulæ is that made by Lumière, but no doubt any reliable metol will answer as well. But it is necessary to caution the Autochrome worker against using any de-

veloper which may be sold as metol or its equivalent. During the last few years a number of products have come upon the market for which the vendors have claimed the properties of metol. The use of a substitute which is not identical with metol will only be a cause of disappointment in the use of these formulæ. Those who do Autochrome work only at comparatively infrequent intervals will be well advised to buy the developer ready made in solution as supplied by Lumière.—Victor Crëmier, in *B. J.*

Ammonia with Pyro-soda

A reader using an old pyro-soda developer found it very slow in action, and the negatives finally obtained were thin and lacking in detail. On adding some ammonia to the developer the results were much better. This led him to wonder if there were any advantage in always making such an addition. The obvious conclusion is that his soda solution had so deteriorated as to have become almost inert: though it is difficult to imagine how such a change had arisen, as the carbonate is the ingredient least likely to change. The carbonate was no longer properly performing its function as an accelerator and allowing the pyro to reduce the silver bromide to the metallic state. By adding ammonia he was simply providing another well-known accelerator, and one that was formerly very popular. If the carbonate of soda is no longer in good working order in the solution, the developer will not work properly. If it is the sulphite of soda that has lost its efficacy, it will no longer perform its duty of keeping the image and the gelatin clean and free from undue stain. The whole matter is an object lesson in the importance of having some knowledge of the purpose of each of the constituents of such a developer. Pyro, carbonate, sulphite, and (if present) potassium bromide, each has its separate function: and the failure of any one to do its particular share of the work will inevitably affect the results.

The Influence of Hypo in the Metol Developer

The influence of hyposulphite of soda on the metol developer is a question worthy of research, and it gives me pleasure to make known my experiments in this direction.

It will no doubt seem strange that hyposulphite of soda should have a beneficial effect in any developing solution, the characteristics of this chemical rather foreshadowing a deleterious influence. This is, however, not so in practice, the presence of hyposulphite of soda in small quantities being of great advantage in metol-developing solutions.

My primary experiments consisted of a comparison of the following formulæ:

A	
Water	1000 min.
Metol	15 gr.
Sulphite of soda	150 gr.
B	
Water	1000 min.
Carbonate of soda	330 gr.

Twenty parts of A to 10 parts of B and 30 parts of water were then mixed ready for use.

A pyrogallic acid developer of normal strength was then prepared as follows:

A	
Water	1000 min.
Sulphite of soda	200 gr.
Pyro	28 gr.
B	
Water	1000 min.
Carbonate of Soda	100 gr.

Twenty parts of A, 20 parts of B, and 20 parts of water were then mixed ready for use.

These two solutions were placed in separate trays; a number of plates of one emulsion were now exposed under a Warnecke sensitometer, thus assuring equal exposure, and a plate was placed into each solution of developer at the same moment. The development was continued until the number of the sensitometer representing the speed of the plate was of like density on both plates.

Upon fixing the plates it was apparent that the negative developed with metol, although showing greater details, was not quite as brilliant as the pyro negative.

Further test was made with new solutions prepared by exactly the same formulæ, adding to the B solution of the metol development 1, 2, 5, and 10 parts of hyposulphite of soda. The developer which contained one part of hyposulphite of soda gave a result equal in brilliancy in every respect to the pyro developer, with fine contrast and an absolute clearness. The absolute freedom from fog in the metol solution thus prepared was remarkable, and in many respects the negative was to be preferred to the result obtained with pyrogallic acid.

The addition of hyposulphite of soda to the metol developer acts as a retarder to a certain degree, and certainly prevents a fog. *Greater detail is obtained* than without its use, although if the hypo is increased in quantity the effect is exactly reversed.

Satisfied that this subject was worthy of further research, I experimented for some time with the following:

Metol-hypo Developer

A	
Water	1000 min.
Metol	15 gr.
Sulphite of soda	150 gr.
B	
Water	1000 min.
Carbonate of Soda	330 gr.
Hyposulphite of soda	1 gr.

For studio work I found best suited 40 parts of A; 20 parts of B; 20 parts of water. For landscapes, 20 parts of A; 10 parts of B; 30 parts of water.

In my experiments I invariably tested this developer against a normal pyrogallic-acid developer and found that metol-hypo developer prepared after the above formula gave most excellent results for both portraits and landscapes, and that the results were fully equal if not superior to pyro developer.—J. M. E.

A Copying Hint—How to Avoid Grain

HAVING occasion quite recently to copy a couple of bromide prints on a paper having a medium grained surface, I was considerably troubled by the grain of the paper.

To those who have not done much copying, I may explain that a print on rough-surfaced paper, when copied with ordinary lighting, gives a more or less mottled appearance owning to each tiny little hillock of the rough surface casting a shadow. The side toward the light, on the other hand, receives more than the normal lighting, so that we get a series of tiny little light patches with little patches of shadow alongside, thus producing a more or less mottled appearance mentioned above.

The usual way of avoiding this is to illuminate the print equally from as many different directions as possible. In practice, two are usually sufficient: say at about 45 degrees from the left-hand side and about 45 degrees from the right-hand side. In this way the shadow side of each hillock, from one direction of the lighting, is the illuminated side of the other, and if the lights are of approximately equal intensity the mottled appearance is very considerably reduced.

The appearance of grain is not entirely removed, because the summit of each little roughness is illuminated by both lights and is therefore a little brighter than the hollows.

As enlargements had to be made from the copy negatives, it was desirable that the grain and the effects of the surface sheen should be eliminated as much as possible, and as ordinary copying methods failed to do this sufficiently, some fresh scheme had to be devised. (I might mention here that two process engravers had failed to make satisfactory blocks of the prints in question, so that they were fairly difficult subjects.)

After several attempts the following method was found to be entirely successful:

The only additional material required is a sheet of good quality glass, free from flaws and a little larger than the prints to be copied, some glycerin, and a large sheet of black paper or a dark cloth—even brown paper will do.

A pool of glycerin, as free from air-bubbles as possible, is placed in the middle of the glass, which is lying flat on a newspaper spread on the table. The print is then bent in a curve, film outward and the middle brought in contact with the pool of glycerin. Then the curve is gradually straightened out and the glycerin will be driven slowly out in a thin film, so that the print is now connected to the glass by a film of glycerin without any air-bubbles. If any air is imprisoned it may be possible to squeegee it out. If not, lift the print and try again, as any tiny air-bubbles will show distinctly in the copy negative. If the print is on very rough paper it will be found easier to get rid of air-bubbles if the surface of the print is first coated with glycerin so that the hollows are completely filled with it, as it is there that the air tends to stick.

It will now be found that the print is very much brighter in appearance, looking like a *wet* print instead of a *dry* one—and the grain has practically disappeared. The reason for this is that glycerin has a refractive index very nearly the same as that of ordinary plate glass. (As an instance of this, a glass rod in a bottle full of glycerin is almost invisible.) Since the glycerin fills up all the hollows of the paper, and is in contact with the entire film of the print and also with the surface of the glass, this is practically equivalent to mounting the print in optical continuity with glass, *i. e.*, we have to all intents and purposes substituted the surface of the glass for that of the print.

All that now remains is to copy the print in such a way as to avoid surface reflections from the glass. The method I adopted was this:

The glass with print glycerined onto it was placed on a board and fastened to it with glass-headed dark-room pins. The board was then fastened on a wall and the camera set up in front of it, taking care to ensure parallelism. As the lens is opposite the center of the glass, it follows, from the laws of reflection, that the only objects reflected from the glass into it, will be objects straight in front of the glass, *e. g.*, bright parts of the camera—the white shirt of the operator, etc. To avoid this, take a sheet of brown paper, say, at least four times the size of the sheet of glass, and make a hole in the center through which the lens projects and hold it in position while exposing. Now, the only possible object which can be reflected from the glass into the lens is the feebly actinic brown paper, and what reflection there is will be uniform all over. Theoretically, black paper or cloth would be better, but I have found the brown paper quite effective and more easily obtained.

Diffused daylight is perhaps the best light to use, and the exposure should be a generous one, say double the calculated exposure.

When a good copy negative has been secured the print is removed from the glass, rinsed under the tap and dried. Glycerin mixes with water in all proportions so is very readily removed, and the print remains as good as ever.—*Australasian Photo Review.*

Cleaning Hand Stains

YOU have noticed, no doubt, that some photographers keep their hands as clean as a debutante's, while others have stained fingers and nails which remind you of the days when, as boys, we used to gather black walnuts and muss up our fingers with the stain it took weeks to wear off. But the walnut stain could be removed with the juice of a half-ripe tomato, "squashed" in the hands and well rubbed in.

One of the reasons for pyro stains, strange as it may seem, is cleanliness. The man who is forever washing and drying his hands while he is developing is going to get them stained. The washing is well enough, but it is the drying that's bad. Dry hands stain, while wet ones don't, to any appreciable extent.

Some even claim that staining can be entirely done away with if dry fingers are never dipped into the developer—if the hands are kept wet and rinsed before and after placing them in the developer and after having them in the hypo.

It seems easy enough to keep the hands wet, but it isn't, for there is always that desire to dry them.

I remember an old boss of mine who was quite a social light in our small town and he never had stained fingers. He kept an old mortar in the sink alongside the developing tray in which he kept a weak acid solution. About 1 ounce of hydrochloric acid to 50 ounces of water will do though I don't believe he ever measured it. He rinsed his hands in this before and after having them in the developer and kept them free from stains.

But most people prefer to use ordinary precautions, such as rinsing the hands frequently, and then to remove any stains afterward, which is very simple if you have no cuts on your fingers. The stain remover is the permanganate and bisulphite formula which has often been recommended but which you may have forgotten.

There are two solutions: No. 1 consists of about one-half ounce permanganate of potash to 50 ounces of water, and No. 2, 5 ounces of bisulphite of soda to 10 ounces of water, or a larger quantity in the same proportions.

To remove stains from the hands it is necessary to thoroughly rub and scrub the hands, nails and under the nails with the No. 1 solution, which is a poison, so cuts must be avoided. When the hands have been thoroughly stained with the permanganate they must be just as thoroughly scrubbed with the No. 2 solution, which takes away both the permanganate and pyro stains and leaves the hands clean.—*Photo-Digest.*

Photographic Materials and Processes

Photographic sensitometer; New non-intermittent ——. L. A. Jones. Phot. J., 1920, 60, 80—98.

Two instruments of the continuous exposure-variable time type are described. In the second instrument, which is better adapted for routine work, a shutter, actuated by a solenoid and ratchet, moves quickly but discontinuously across the sensitive surface at definite time intervals. In the timing mechanism, which controls the solenoid, a cinema film, moved at a uniform speed by a governed electric motor, is provided with a series of collinear apertures spaced from one another at distances corresponding with the exposure ratios required; the distances are measured in terms of the edge perforations to allow for normal variations in the length of the cinema film. One arm of a lever rests on the film in line with the operating apertures, into which successively it drops as the film moves; the lever carries an electric contact point so that the current operating the solenoid is completed when the lever drops. Other perforations, etc., are arranged so that the depression of a contact switch starts the whole apparatus, which continues in operation until the exposure is finished and is then automatically cut off. A number of exposure machines may be connected at a central station with corresponding timing mechanisms operated by the same motor. Tables are given showing the timing mechanism to be satisfactory when tested against a chronograph and showing the speed and gamma obtained for a photographic plate to be independent of the absolute exposure, not variable with it as is the case with intermittent exposure machines.

Dye impression photographic printing process. F. W. Donisthorpe. Phot. J., 1920, 60, 119.

A NEGATIVE, on paper, glass, or other suitable support, is treated in a special preparing bath for about 10 min., rinsed, and then treated with a dye solution for 3—10 min., according to the exposure and development of the negative, a longer immersion being required for overdevelopment or overexposure. After rinsing the dyed negative it is ready for the production of positives, in the color of the dye used, by pressing on to it damp gelatin-coated or baryta-coated paper, contact for about 1 min. being requisite. After taking off, the print merely requires quick drying.

Colloidal silver; Formation of —— in photographic developers and means of avoiding it. L. Lobel. Bull. Soc. Franç. Phot., 1920, 7, 21—22.

IN using developing solutions containing sodium sulphite small quantities of silver bromide pass into solution. This occurs, in general, more easily with papers than with plates, since the bromide is in a finer state of division, and more easily with developers having a low content of alkali carbonate in proportion to the sulphite. The dissolved silver salt is reduced by the developer, and part of the reduced silver is deposited on the dishes, etc., and part remains in colloidal solution. Continued use of the developer tends to the production of dichroic fog by deposition of the colloidal silver in the body of the film, and solutions still having considerable developing power may be rendered useless on this account. Ordinary filtering methods will not hold back the colloidal silver. If, however, about 20 per cent. of sodium sulphate is added the colloidal silver is coagulated and deposited; its formation is also prevented by the addition of the same salt to a new developer.

Colored [photographic] sensitizers derived from quinolines, quinaldines, and lepidines containing dimethylamino and diethylamino groups. H. Barbier. Bull Soc. Chim., 1920, 27, 427—439.

THE author has prepared the methiodides and ethiodides of *p*-dimethylaminoquinoline, of 6-diethylaminoquinoline, of 6-dimethylamino quinaldine, and of 6-dimethylaminolepidine, and finds that when these alkyl iodides containing a dialkylamino group are condensed among themselves or with alkyl iodides of other bases or with *p*-dimethylaminobenzaldehyde, they give a series of new coloring matters belonging to the cyanines. All of these cyanines, which contain the active auxochrome group, $N(CH_3)_2$ or $N(C_2H_5)_2$, can be used as photographic sensitizers. (*Cf.* J. C. S., Aug.)

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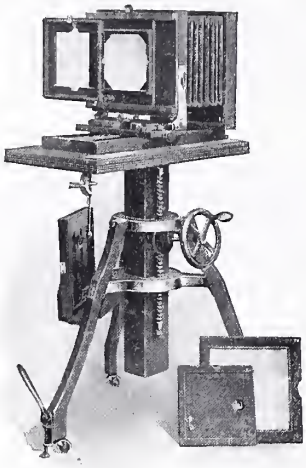

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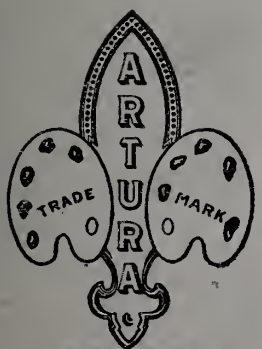

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